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SOCIETY FOR FORENSIC GENETICS

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## ***Pre-Congress Workshop HW6***

# **Scientific Publication: Reading, Writing, and Reviewing**

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*U.S. National Institute of Standards and Technology*

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10 September 2019



# Acknowledgments and Disclaimer

**Points of view are mine** and do not necessarily represent the official position or policies of the National Institute of Standards and Technology or of *Forensic Science International: Genetics* or the *Journal of Forensic Sciences* (where I serve on editorial boards).

Certain commercial entities are identified in order to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by the National Institute of Standards and Technology, nor does it imply that any of the entities identified are necessarily the best available for the purpose.

# Value of Studying this Topic



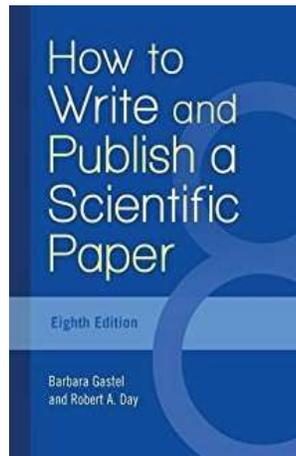
<http://www.rolexawards.com/FILE/5069.jpg>

**Gerard Piel**

(1915 – 2004)

Publisher of *Scientific American* magazine

**“Without publication,  
science is dead.”**



**“A scientific experiment is  
not complete until the  
results have been published  
*and understood.*”**

- Robert A. Day

# Some Topics We Hope to Address

- How to **find** the best articles to answer my questions or to strengthen my research efforts
- How to gain the most from articles that I **read**
- How to **store** articles that I collect so I can find them again
- How to **review** or become a better peer-reviewer
- How to **write** or to improve my writing
- How to **revise** manuscripts to address concerns raised during the review process



# Workshop HW6 Outline

## *Scientific Publication*

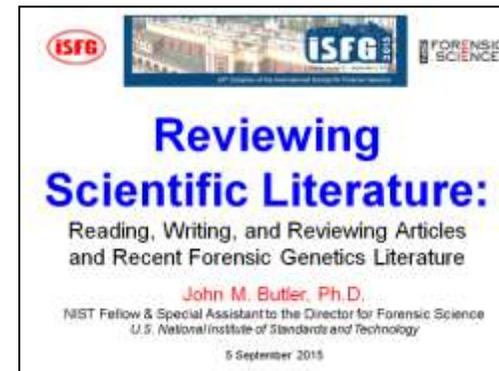
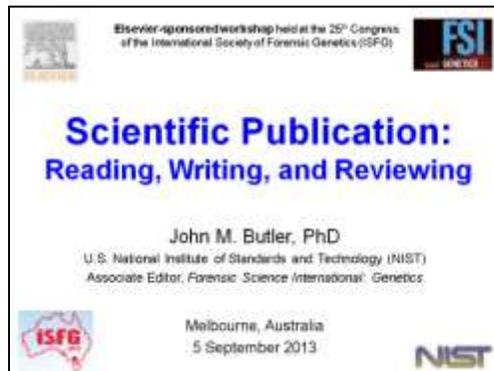


Time	Topics
9:00 – 9:30	Introduction & Expectations; Bibliometrics
9:30 – 10:00	Searching, Collecting, and Storing Articles
10:00 – 10:30	Reading and Reviewing Articles
10:30 – 11:00	<b>BREAK</b>
11:00 – 12:30	Writing, Authorship, and Creating Useful Figures and Tables
12:30 – 13:00	Submission & <i>FSI Genetics</i> experiences

# ISFG Presentations on **Scientific Publication**

- **2013 (Melbourne)** – evening (**1 hour**) workshop sponsored by Elsevier
- **2015 (Krakow)** – **45 minute** talk on Saturday morning
- **2017 (Seoul)** – pre-conference (**3 hour**) workshop

Available on <http://strbase.nist.gov/NISTpub.htm#Presentations>



# Article from my ISFG 2013 workshop

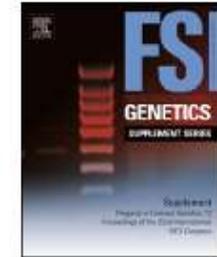
Forensic Science International: Genetics Supplement Series 4 (2013) e115–e116



Contents lists available at [ScienceDirect](#)

Forensic Science International: Genetics Supplement Series

journal homepage: [www.elsevier.com/locate/FSIGSS](http://www.elsevier.com/locate/FSIGSS)



The triad of scientific publication: Reading, writing, and reviewing



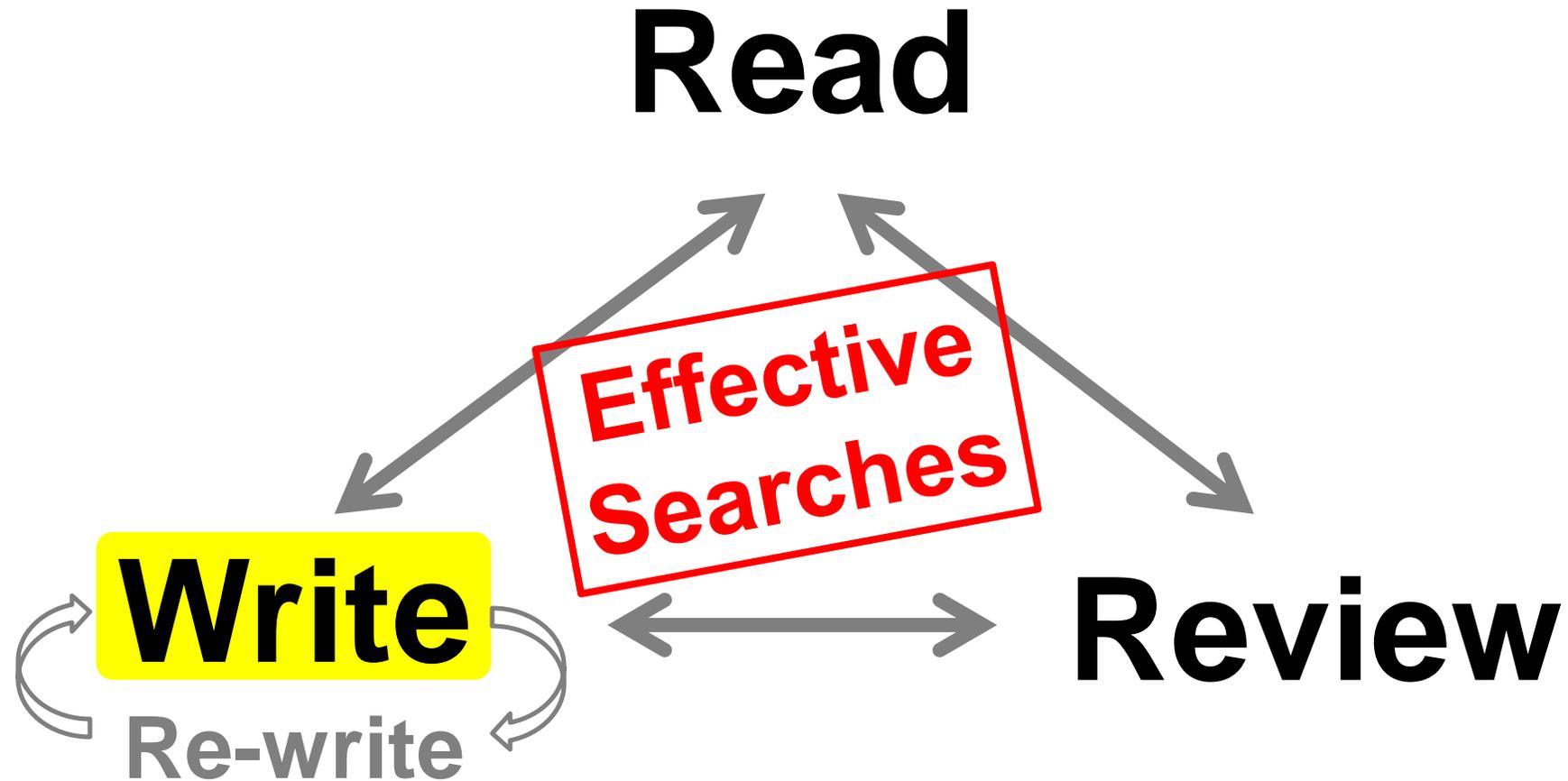
John M. Butler\*

*National Institute of Standards and Technology, Gaithersburg, MD, USA*

...“An important purpose of scientific publication is to document work performed to aid the advancement of science. In short, writing enables history.”

...”Reviewing manuscripts is a chance to influence the community for good and to provide service back to journals...”

# The Triad of Scientific Publishing



*Making full use of the scientific literature...*

# A 2016 Workshop on Improving Forensic Science Literature Searches

Susan Makar   Amanda Malanowski   Matthew Wood   John Butler   Jeff Teitelbaum   Melissa Taylor



 **W1: Information Does Exist Beyond the First Page of Your Google® Search!**  
American Academy of Forensic Sciences  
Las Vegas, NV (February 22, 2016) 

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**Information Does Exist Beyond the First Page of Your Google® Search!**  
Tools and Strategies for Forensic Science Literature Searching and Use

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**Chair: John M. Butler**  
**Co-Chair: Matthew R. Wood**

## Topics Covered:

- Why Search & Read the Literature
- Free Information Resources
- Using Web of Science
- Case Examples
- ForSciPub Vision
- AAAS, NCFS, and OSAC Activities

[http://strbase.nist.gov/training/AAFS2016\\_LiteratureWorkshop.htm](http://strbase.nist.gov/training/AAFS2016_LiteratureWorkshop.htm)

# Topics in This ISFG 2019 Workshop

## **The 3 R's of Scientific Publication: Reading, (Re-)Writing, and Reviewing**

- **Reading**
  - Strategies & tools for reference collection
- **Writing**
  - Submission & peer-review process
- **Reviewing**
  - Experiences with *FSI Genetics*

# Target Audience for This Presentation

- Young (or even more seasoned) scientists who want to learn how to write better or become a more effective reviewer
- Anyone who wants to better understand the review process

**“Writing a manuscript is arguably the single most critical component to being a scientist – one for which, in many cases, formal training is minimal.”**

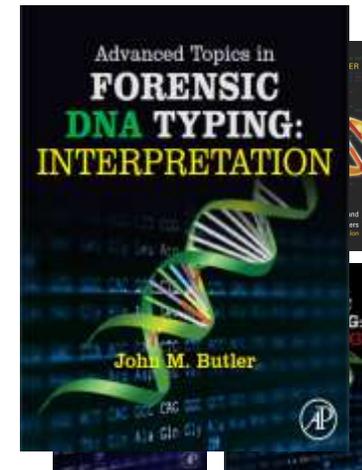
- Dr. Nathan Blow, *BioTechniques* editor-in-chief (May 2013, p. 235)



# My Qualifications on this Topic

- Degrees in chemistry
  - BYU (B.S., 1992), University of Virginia (Ph.D., 1995)
  - **Undergraduate classes on scientific writing and public speaking**
- Research-focused career
  - **Published >170 articles and invited book chapters**
  - Given >400 presentations on scientific topics
- Love for teaching
  - More than 50 workshops on DNA topics
  - **Written five books (so far) on forensic DNA typing**
- Active reviewer and journal editor responsibilities
  - Associate editor of *Forensic Science International: Genetics* since 2007
  - **Reviewed hundreds of articles for >20 different journals**
- Avid lifelong reader of history and science
  - **Read >2,000 books and thousands of articles**

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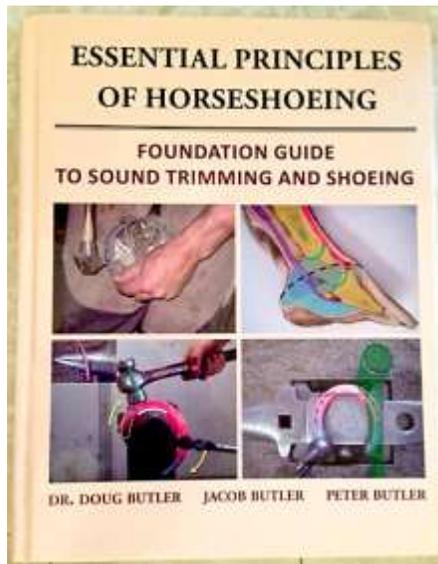
Quote on p. xv, J.M. Butler (2015) *Advanced Topics in Forensic DNA Typing: Interpretation* (Elsevier: San Diego)

# Doug Butler Thoughts on Learning

“You never really learn anything until you have to teach it to someone else.”



My father has written a dozen books covering his field of **horseshoeing** and started his own school after teaching at three different universities.



His latest book (2012)



Making horseshoes



Putting shoes on the horse

# Acknowledgments for Those Assisting Me in Gaining My Experience in Scientific Writing



- My father inspired me to write through his example of authoring textbooks (my first book is dedicated to him)
- **My wife regularly corrects me and helps me ensure that my words can reach a non-scientist**
- Colleagues at NIST (particularly Kathy Sharpless & Dave Duewer) have provided input on my last three books & other research/review articles over the years
- Graduate school advisors (Bruce McCord, **Ralph Allen**, & Bruce Budowle) had an important influence on helping me writing my PhD dissertation and my first few research papers



Giving a copy of my 5<sup>th</sup> book on DNA to my professor, Ralph Allen, on his retirement (November 2015)

# Introductions & Expectations

- **Your Name?**
- **Your Laboratory/Employer?**
  - Or are you a student?
- **What you hope to learn in this workshop?**

# Workshop Participant Expectations

- Improve writing skills
- Tips on writing
- Literature searches
- Reading and reviewing process
- Improve reviewing
- Learn to organize my literature
- Improve teaching of students on writing
- Become writing and reviewing
- Become a more efficient writer
- Writing more focused sentences
- Thoughts on the future of publishing
- Metrics on the value of publication
- How to write more concise
- Be motivated to write more
- How to shape education for scientists
- Improve reviewing skills
- Better strategy for my next publication
- Finding the right article for my research
- How to find the best article
- Understanding the publication process
- Convert chapters into paper
- What is the best format to publish
- Supplemental vs main text

***To Be Completed during the Workshop***

# Workshop Participant Expectations (1)

- How to write a good paper
- Learn tricks on writing and reading
- Help with PhD thesis writing
- Report writing
- Art of writing
- Organizing ideas when writing
- Authorship and reviewing experiences
- How to publish case reviews
- Doing literature reviews
- Make writing process more smooth
- How much detail to go into
- Data that should be published in population genetics
- How to identify critical information to include in articles
- Accelerating the publication process
- How to respectfully disagree
- Writing for an international audience
- Writing for a non-scientist audience

***From 2017 ISFG Workshop***

# Workshop Participant Expectations (2)

- Balance of too much data and too little data
- How to technically correct but not over correct
- How to write to non-scientific people
- Basics of how to write a paper
- Details with submission
- Basic criteria for a good article
- How to write in a time efficient manner
- Learn English writing skills
- What impact factor means
- What is required for submission
- How to get to a specific group of readers

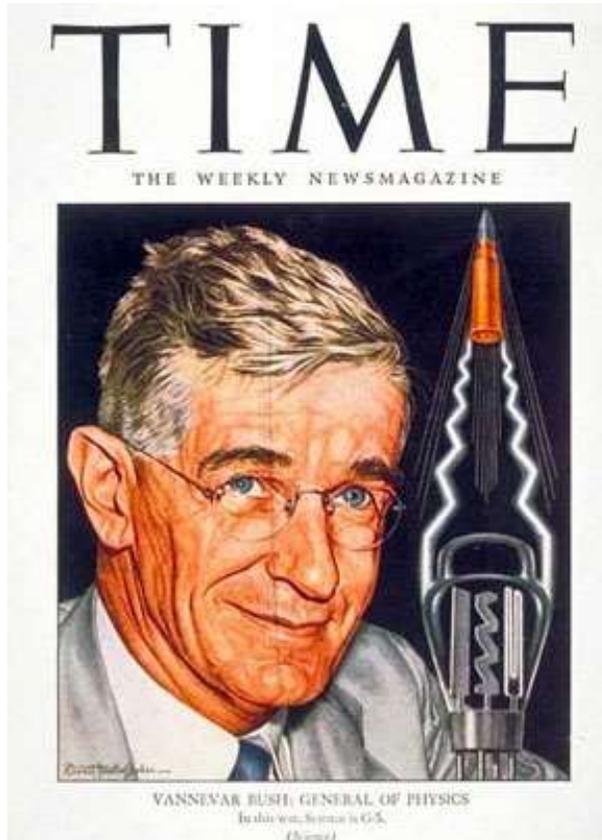
***From 2017 ISFG Workshop***

The Literature  
and  
**Bibliometrics**

# Why Publish Scientific Articles?

- **To spread information and share new knowledge with others**
- To gain recognition, success and prestige for the authors and their institutions
- To win promotion to higher positions, job security, and tenure within academia
- To enhance chances of obtaining grants and research funding
- To gain priority for making a discovery

# Scientific Publication Advances Knowledge



“Science... has provided a **record of ideas** and has enabled man to manipulate and to make extracts from that record so that knowledge evolves and endures **throughout the life of a race** rather than that of an individual.”

- Vannevar Bush

Slide from AAFS 2016 workshop (Information Does Exist Beyond the First Page of Your Google Search)

Melissa Taylor “ForSciPub: A Vision for the Future of Forensic Science Literature”

Available at [http://strbase.nist.gov/training/7\\_AAFS2016-W1-Taylor.pdf](http://strbase.nist.gov/training/7_AAFS2016-W1-Taylor.pdf)

# Ranking of the Value and Relevance of Scientific Writing

Lesser  
value



- Website blogs and opinion pieces
- Non-peer reviewed articles
  - Conference proceedings
  - Letters to the editor
  - Many review articles
- Peer-reviewed research articles – with data!
- **Highly cited scientific articles**
  - Shows support from other scientists over time
  - **Truly a measure of “scientific acceptance”**

Greater  
value

# National Commission on Forensic Science (NCFS) Activities Regarding Forensic Literature

<https://www.justice.gov/archives/ncfs>

- **NCFS Scientific Inquiry & Research Subcommittee discussed issues with the forensic science literature**

“A cursory review of the literature citations raised concerns within the NCFS that extend beyond these specific [SWG] bibliographies [provided to the SoFS]:

“1. In some cases, it was unclear which literature citations are crucial to support the foundation of a particular forensic science discipline.

“2. Some of the cited literature had not undergone a rigorous peer-review process.”

Available at <https://www.justice.gov/archives/ncfs/file/786591/download>

From Jan. 2015 NCFS work product: “Scientific Literature in Support of Forensic Science and Practice”



# NATIONAL COMMISSION ON FORENSIC SCIENCE

**NIST**  
National Institute of  
Standards and Technology  
U.S. Department of Commerce

## Scientific Literature in Support of Forensic Science and Practice

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**Commission Action:**

On January 30, 2015, the Commission voted unanimously to adopt this work product.

**Type of Work Product:**

Views Document issued by the Scientific Inquiry and Research Subcommittee

- “The NCFS believes that **a comprehensive evaluation of the scientific literature is critical** for the advancement of forensic science policy and practice in the United States.”  
**[and worldwide as well...]**

Available at <https://www.justice.gov/archives/ncfs/file/786591/download>

From Jan. 2015 NCFS work product: “Scientific Literature in Support of Forensic Science and Practice”

It is the position of the NCFS that **foundational, scientific literature supportive of forensic practice should meet criteria** such as the following:

- **Peer-reviewed** in the form of original research, substantive reviews of the original research, clinical trial reports, or reports of consensus development conferences 
- **Published in a journal or book** that has an **International Standard Number** (ISSN for journals; ISBN for books) and **recognized expert(s) as authors** (for books) or on its Editorial Board (for journals)
- Published **in a journal** that maintains a clear and publicly available statement of purpose **that encourages ethical conduct such as disclosure of potential conflicts of interest** integral to the peer review process
- Published **in a journal that utilizes rigorous peer review with independent external reviewers** to validate the accuracy in its publications and their overall consistency with scientific norms of practice
- Published **in a journal that is searchable using free, publicly available search engines** (e.g. PubMed, Google Scholar, National Criminal Justice Reference Service) that search major databases of scientific literature (e.g. Medline, National Criminal Justice Reference Service Abstracts Database, and Xplore)
- Published **in a journal that is indexed in databases that are available through academic libraries and other services** (e.g. JSTOR, Web of Science, Academic Search Complete, and SciFinder Scholar)

Available at <https://www.justice.gov/archives/ncfs/file/786591/download>

From Jan. 2015 NCFS work product: "Scientific Literature in Support of Forensic Science and Practice"

# Bibliometrics

efforts to measure scientific productivity  
in an academic world of “Publish or Perish”

- **Impact factor (for journals)** [http://en.wikipedia.org/wiki/Impact\\_factor](http://en.wikipedia.org/wiki/Impact_factor)
  - a measure of the citations to science journals
  - can reflect relative importance of a journal to its field
  - devised by Eugene Garfield, the founder of the Institute for Scientific Information
  - calculated yearly starting from 1975 for those journals that are indexed in the *Journal Citation Reports*
- **h-index (for authors)** <http://en.wikipedia.org/wiki/H-index>
  - described in 2005 by Jorge Hirsch (*Proc Natl Acad Sci* 102: 16569-16572)
  - an attempt to measure an author’s productivity and impact
  - based on a list of an author’s publications ranked in descending order by the number of times each publication is cited
  - value of h is equal to the number of papers (N) in the list that have N or more citations

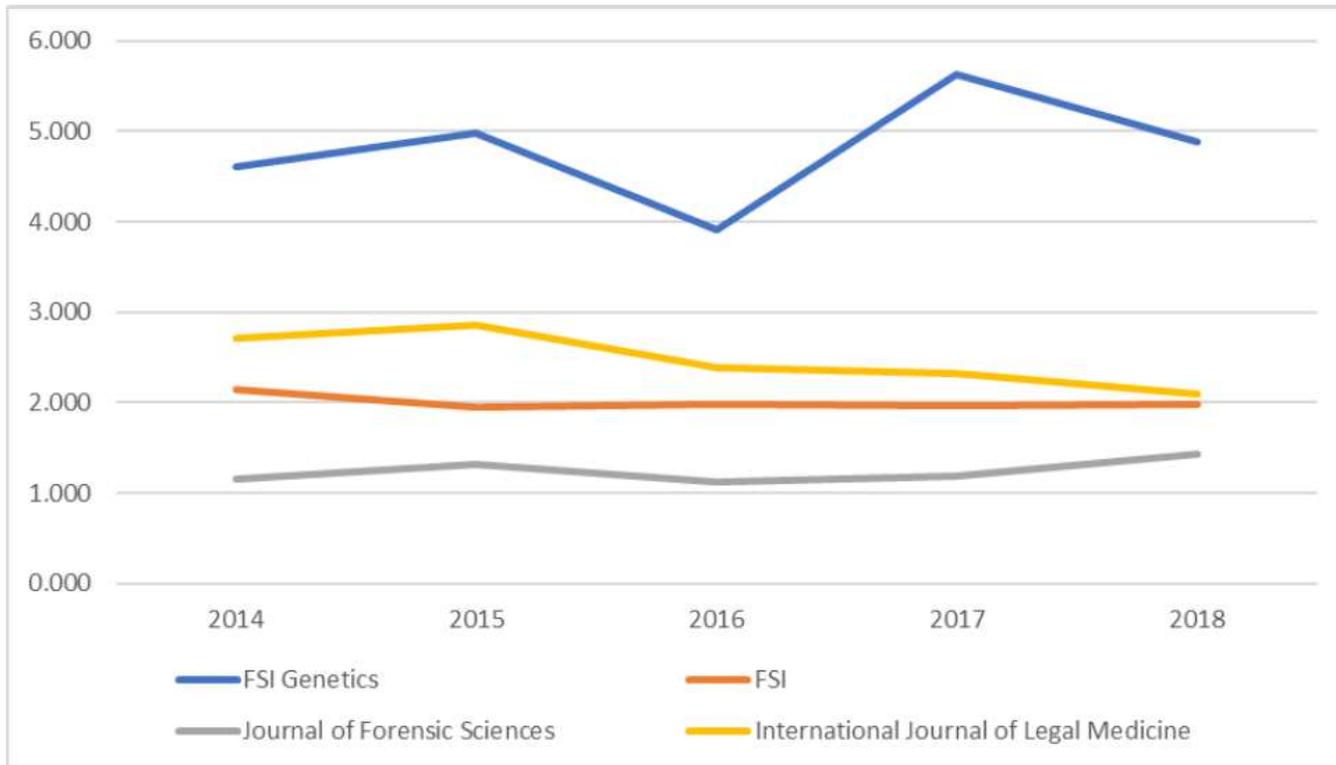
# Tools for Performing Bibliometrics

- **Science Citation Index** (prior to 2000)
  - CD-ROM from the Institute for Scientific Information

## Web-based tools

- **Web of Science** (since 2002; subscription fee)
  - Thomson Reuters → Clarivate Analytics  
(<https://www.webofknowledge.com/>)
  - 1.3 billion cited references back to 1900 from >18,000 journals
- **Scopus** (since 2004; subscription fee)
  - Elsevier (<https://www.scopus.com>)
  - Most coverage only back to 1996 from ~23,000 journals & >150,000 books
- **Google Scholar** (since 2004; free)
  - Google (<https://scholar.google.com/>)
  - Size of available reference set is unpublished

Journal	2014	2015	2016	2017	2018
<i>FSI Genetics</i>	4.604	4.988	3.911	5.637	4.884
<i>FSI</i>	2.140	1.950	1.989	1.974	1.990
<i>Journal of Forensic Sciences</i>	1.160	1.322	1.127	1.184	1.438
<i>International Journal of Legal Medicine</i>	2.714	2.862	2.382	2.316	2.094



**FSI Genetics has maintained its #1 ranking in the forensic science and legal medicine topic area**

# Impact Factor of a Journal



Eugene Garfield

- Concept first described in 1955 and further developed over the years by Eugene Garfield
- Reflects the average number of citations to recent articles published in the journal

Citation Indexes for Science  
A New Dimension in Documentation  
through Association of Ideas  
Eugene Garfield

Garfield, E. (1955) *Science* 122: 108-111

**For example, an impact factor for 2016 (released in 2017)**

**Reflects  
a 2-year  
window  
of use**

**The number of times that articles published in the journal in 2014 and 2015 were cited by articles in indexed journals during 2016**

**The total number of “citable items” published in that journal in 2014 and 2015**

See Garfield, E. (2006). The history and meaning of the journal impact factor.  
*Journal of the American Medical Association* 295: 90-93

# Some Research Metrics Can Go Too Far

“ Metrics have proliferated: usually well intentioned, not always well informed, often ill applied. **We risk damaging the system with the very tools designed to improve it...**”

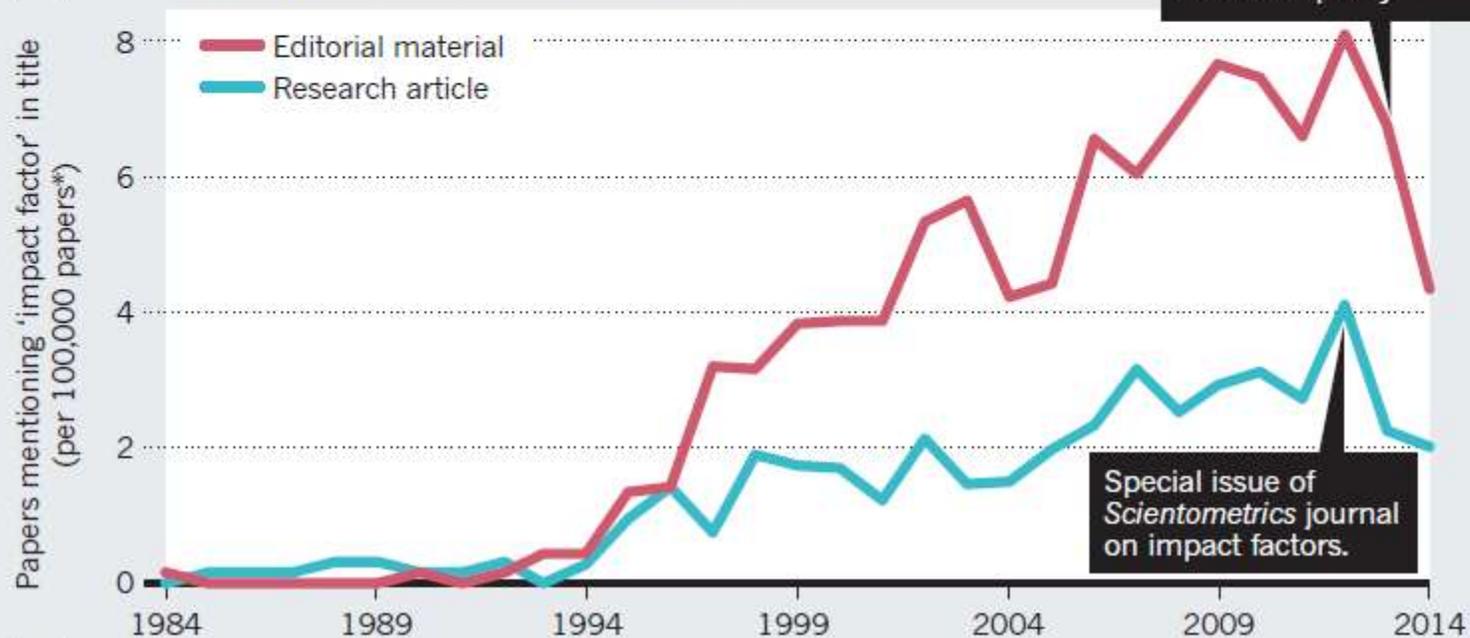
DATA SOURCE: THOMSON REUTERS WEB OF SCIENCE; ANALYSIS: D.H., L.W.

## IMPACT-FACTOR OBSESSION

Soaring interest in one crude measure — the average citation counts of items published in a journal in the past two years — illustrates the crisis in research evaluation.

†DORA, San Francisco Declaration on Research Assessment

### 1 ARTICLES MENTIONING 'IMPACT FACTOR' IN TITLE



**Inventor of the  
impact factor  
passed away on  
26 February 2017**

# Eugene Garfield

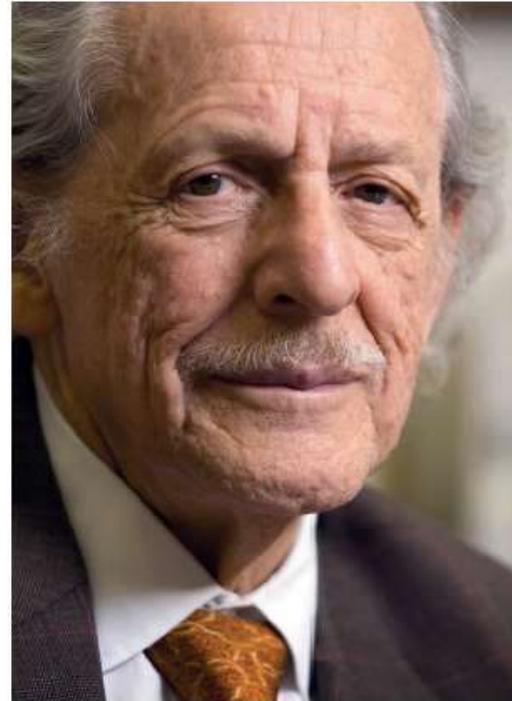
(1925–2017)

Inventor of the Science Citation Index.

“I think you’re making history, Gene!” So said Nobel laureate and molecular biologist Joshua Lederberg to his friend Eugene Garfield in 1962. They were building the Science Citation Index (SCI), now the Clarivate Analytics Web of Science, with long-sought grants from US funding agencies. Today, we cannot imagine research without indexes that reveal how articles are cited. Garfield enabled an entire field: scientometrics, the quantitative study of science and technology.

Garfield died on 26 February. We met in 1992, when I was writing a history of the index. That was a few months before he sold the Institute for Scientific Information (ISI), the company he had founded (initially named Documation) in 1956 in Philadelphia, Pennsylvania, to Thomson Reuters. He stayed on as chairman emeritus, a bomb of energy, still coming up with ideas for applying citation indexes.

Garfield also launched *The Scientist* — a monthly magazine for life scientists — together with indexes in the social sciences and humanities, and services that



In 1951, he landed a job at the Welch Medical Library at Johns Hopkins University in Baltimore, Maryland, where almost all information services of the National Library of Medicine

at conferences, making prototype indexes and sending proposal after proposal to the US Patent Office, the National Science Foundation and the National Institutes of Health. Funding finally became available after 1957, when the launch of the Soviet Union’s Sputnik satellite unleashed panic in the United States about the information crisis in science. Funders wanted ways to evaluate their effectiveness. Lederberg and Garfield joined forces to build an automated citation index across science.

Nonetheless, for many years, the SCI made a loss, supported by profits from *Current Contents* and other ISI services. Neither scientists nor librarians saw much use for these expensive books (a ten-year set could cost US\$25,000) with their long lists of code in small print. The exception was the community of historians and sociologists of science. For example, Derek de Solla Price, a science historian at Yale University in New Haven, Connecticut, and sociologist Robert Merton at Columbia University immediately saw the SCI as an instrument for analysing the dynamics and structure of science, and each developed theories about citations in research.

COURTESY OF CLARIVATE ANALYTICS

# Nobel Laureate Richard Roberts Calls for Eliminating the Journal Impact Factor

**Roberts, R.J. (2017) An obituary for the impact factor. *Nature* 546: 600**

- “I suggest that the time has come to formally declare this metric’s [the impact factor’s] demise.”
- “The impact factor is often used, improperly, to provide a mathematical measure of a scientist’s productivity, on the basis of where they published their results. It has proved popular with bureaucrats, and even with many researchers, because **it seems to offer an easy way to determine the value of a scientist’s output for someone who is either unable or too lazy to read that scientist’s papers and judge their true worth.**”
- “**It should never have been used and has done great damage to science.** Let us bury it once and for all.”

# The $h$ -index

(proposed in 2005 by Jorge Hirsch)

**An index to quantify an individual's scientific research output**

J. E. Hirsch\* *Proc Natl Acad Sci USA* (2005) 102: 16569-16572

Department of Physics, University of California at San Diego, La Jolla, CA 92093-0319

Communicated by Manuel Cardona, Max Planck Institute for Solid State Research, Stuttgart, Germany, September 1, 2005 (received for review August 15, 2005)

I propose the index  $h$ , defined as the number of papers with citation number  $\geq h$ , as a useful index to characterize the scientific output of a researcher.

citations | impact | unbiased

**F**or the few scientists who earn a Nobel prize, the impact and relevance of their research is unquestionable. Among the rest of us, how does one quantify the cumulative impact and relevance of an individual's scientific research output? In a world of limited resources, such quantification (even if potentially distasteful) is often needed for evaluation and comparison purposes (e.g., for university faculty recruitment and advancement, award of grants, etc.).

Published papers are rank ordered by decreasing citation number  $\rightarrow$  **the  $h$ -index is the number of the paper rank where the number of citations is greater than the paper rank number**

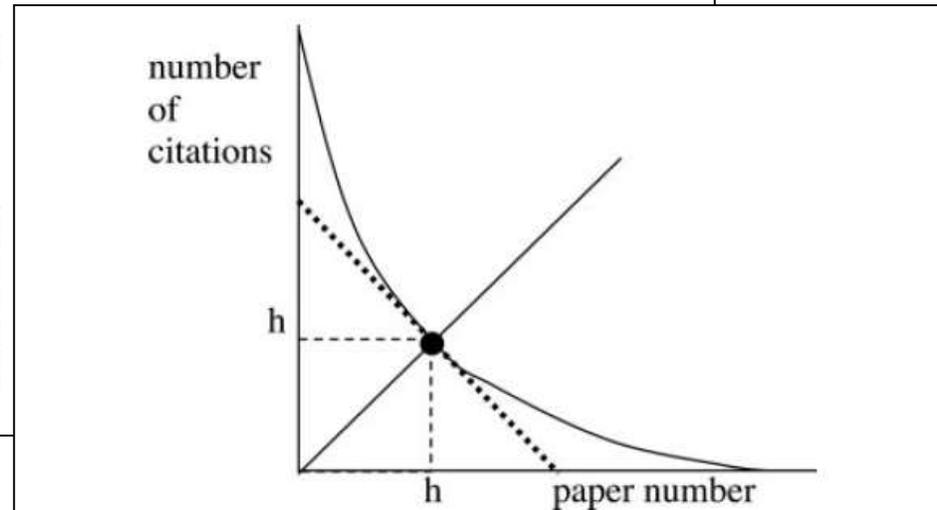


Fig. 1. Schematic curve of number of citations versus paper number, with papers numbered in order of decreasing citations. The intersection of the 45° line with the curve gives  $h$ . The total number of citations is the area under the curve. Assuming the second derivative is nonnegative everywhere, the minimum area is given by the distribution indicated by the dotted line, yielding  $a = 2$  in Eq. 1.

Times cited – ranked highest to lowest with publication year

only first 75 articles shown

# $h$ -index = 59

“John M Butler”  
 Google Scholar  
 Search 6 Aug 2019

*My book (2<sup>nd</sup> edition)*

rank	year	# cites	rank	year	# cites	rank	year	# cites	rank	year	# cites	rank	year	# cites
<b>1</b>	2005	<b>1574</b>	<b>16</b>	2000	<b>202</b>	<b>31</b>	2011	<b>110</b>	<b>46</b>	2008	<b>78</b>	<b>61</b>	2013	54
<b>2</b>	2006	<b>650</b>	<b>17</b>	2010	<b>199</b>	<b>32</b>	2003	<b>105</b>	<b>47</b>	2015	<b>74</b>	<b>62</b>	2008	54
<b>3</b>	2003	<b>583</b>	<b>18</b>	2003	<b>195</b>	<b>33</b>	2004	<b>104</b>	<b>48</b>	1994	<b>74</b>	<b>63</b>	2016	52
<b>4</b>	2006	<b>564</b>	<b>19</b>	2008	<b>173</b>	<b>34</b>	2005	<b>100</b>	<b>49</b>	2011	<b>72</b>	<b>64</b>	2004	50
<b>5</b>	2009	<b>449</b>	<b>20</b>	2004	<b>158</b>	<b>35</b>	2007	<b>98</b>	<b>50</b>	1997	<b>72</b>	<b>65</b>	2017	49
<b>6</b>	2004	<b>447</b>	<b>21</b>	2004	<b>147</b>	<b>36</b>	2012	<b>97</b>	<b>51</b>	1995	<b>72</b>	<b>66</b>	2002	49
<b>7</b>	2011	<b>365</b>	<b>22</b>	2014	<b>146</b>	<b>37</b>	1994	<b>97</b>	<b>52</b>	2001	<b>67</b>	<b>67</b>	2005	47
<b>8</b>	2005	<b>338</b>	<b>23</b>	2006	<b>144</b>	<b>38</b>	2010	<b>95</b>	<b>53</b>	1999	<b>67</b>	<b>68</b>	1998	47
<b>9</b>	2001	<b>304</b>	<b>24</b>	2013	<b>143</b>	<b>39</b>	2016	<b>92</b>	<b>54</b>	2006	<b>64</b>	<b>69</b>	2003	46
<b>10</b>	1995	<b>263</b>	<b>25</b>	2007	<b>133</b>	<b>40</b>	2013	<b>88</b>	<b>55</b>	2005	<b>64</b>	<b>70</b>	2005	45
<b>11</b>	2004	<b>258</b>	<b>26</b>	2005	<b>131</b>	<b>41</b>	2005	<b>88</b>	<b>56</b>	2012	<b>63</b>	<b>71</b>	2013	44
<b>12</b>	2002	<b>256</b>	<b>27</b>	2005	<b>131</b>	<b>42</b>	2013	<b>83</b>	<b>57</b>	2005	<b>63</b>	<b>72</b>	2005	44
<b>13</b>	2007	<b>235</b>	<b>28</b>	1998	<b>119</b>	<b>43</b>	1998	<b>83</b>	<b>58</b>	1996	<b>63</b>	<b>73</b>	2004	41
<b>14</b>	1999	<b>226</b>	<b>29</b>	2014	<b>116</b>	<b>44</b>	2015	<b>79</b>	<b>59</b>	2004	<b>60</b>	<b>74</b>	2001	39
<b>15</b>	2002	<b>205</b>	<b>30</b>	2003	<b>112</b>	<b>45</b>	2009	<b>78</b>	<b>60</b>	2008	<b>57</b>	<b>75</b>	2011	38

*My first article*

*Most recent article shown*

van Noorden, R. et al. (2014) The top 100 papers. *Nature* 514: 550-553

NEWS FEATURE

# THE TOP 100 PAPERS

*Nature explores the most-cited research of all time.*

**57,798,126 papers examined**  
using Web of Science (1900-2014)

# citations	# articles	%
0	25,332,701	44 %
1 to 9	18,280,005	32 %
10 to 99	13,104,875	23 %
100 to 999	1,066,046	1.8 %
1000 to 9999	14,351	0.025 %
>10,000	148	
>100,000	3	

## A 2014 Study on Citations

<http://nature.com/top100>

- “Older papers [have] more time to accrue citations”
- “Biologists tend to cite one another’s work more frequently than, say, physicists.”
  - The top article, a 1951 publication on protein measurement, had been cited **305,148 times**
  - Watson & Crick 1953 article on the structure of DNA had been cited **5,207 times**
  - Hirsch’s 2005 proposal for the *h*-index to measure scientific productivity had been cited **1,797 times**
- **25,332,701 items had received zero citations** while 18,280,005 were cited 1-9 times → **more than three-fourths of published papers receive less than 10 citations**

# **Searching the Scientific Literature**

# What is the Scientific Literature?

John Maddox (the editor of *Nature* at the time) wrote in August 1986:

- *“Professional people have won a poor reputation for their skill at communicating with each other. The complaint may unfortunately be justified.”*
- By what test are the scientific journals counted as literature?
  - “The bare minimum of an answer is that they are collectively referred to in this way by their contributors. Collectively, they also have the quality of permanence; they sit on library shelves for decades on end, and are referred to with reverence by those who contribute to later issues.”

# Some Forensic Science Journals



Elsevier



Elsevier



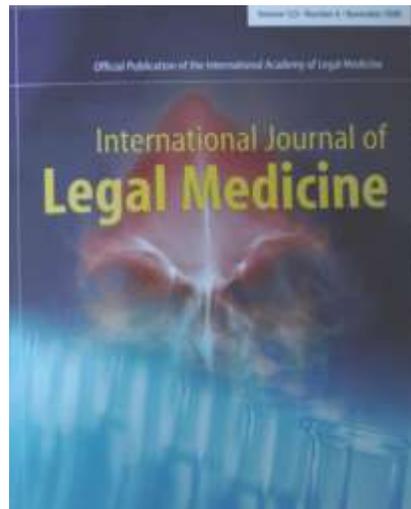
Elsevier



Elsevier



Elsevier



Springer



Springer



Taylor & Francis



Wiley-Blackwell

# Approaches to Retrieving Information

- **Passive reading**
  - You just happen to come across something interesting while browsing a journal that comes across your desk
- **Active searching** on a specific topic
  - Online tools (free resources and subscription databases)
  - Search strategies and key words used make a difference
- **Automated information push** from key words
  - Subscribing to a website RSS (rich site summary) feed informs you as the user to receive notification of any updates to the site based on key words provided



# Selecting What to Read...

**The amount of information available can feel overwhelming at times...**

It has been estimated that >23,000 journals exist and >50 million papers have been published since 1665 [A.E. Jinha (2009) *Learned Publishing* 23:258-263]

- Review entire journal listing of articles
  - Examine journal issue or view table of contents on-line
- Perform directed searches on specific topics
  - PubMed <http://www.ncbi.nlm.nih.gov/PubMed>
  - Web of Science <http://apps.webofknowledge.com>
- Sign up for table of contents delivery via email
- **Examine publications cited in review articles**

# Web of Science Searches Can Help Track Where a Particular Author Publishes

Field: Source Titles	Record Count	% of 93	Bar Chart
FORENSIC SCIENCE INTERNATIONAL GENETICS	23	24.731 %	
JOURNAL OF FORENSIC SCIENCES	18	19.355 %	
ANALYTICAL CHEMISTRY	10	10.753 %	
FORENSIC SCIENCE INTERNATIONAL	8	8.602 %	
ELECTROPHORESIS	6	6.452 %	
INTERNATIONAL JOURNAL OF LEGAL MEDICINE	5	5.376 %	
BIOTECHNIQUES	3	3.226 %	
INTERNATIONAL CONGRESS SERIES	3	3.226 %	
JOURNAL OF MOLECULAR DIAGNOSTICS	3	3.226 %	
ANALYTICAL AND BIOANALYTICAL CHEMISTRY	2	2.151 %	
NUCLEIC ACIDS RESEARCH	2	2.151 %	

Web of Science search (16 August 2017)

# Learn from What Others Pick as Valuable

“Push”

- **Subscribe to an email list** provided by a librarian
  - **Jeff Teitelbaum** and his Washington State Patrol Forensic Laboratory Services Bureau email list



[FLSBLibrary@wsp.wa.gov](mailto:FLSBLibrary@wsp.wa.gov)  
[Jeff.Teitelbaum@wsp.wa.gov](mailto:Jeff.Teitelbaum@wsp.wa.gov)

**>2,500 emails sent in the past two years** with interesting articles to consider reading covering all aspects of forensic science (both current and historical)

“Pull”

- **Review article highlights** on a journal website
  - E.g., <https://www.nature.com/research-highlights/>

[nature.com](https://www.nature.com)

Research Highlights

Our pick of the latest scientific literature



# Review Articles and Citations in Volume 18

## *Special Issue: New Trends in Forensic Genetics*

**1591**  
**references**  
**cited in**  
**these 14**  
**articles**

Author(s)	Topic	Total Citations
J.M. Butler	Introduction and issue summary	14
J.M. Butler	U.S. initiatives to strengthen forensic science	141
T. Sijen	Molecular approaches for forensic cell type identification	153
M. Kayser	Forensic DNA phenotyping	100
C. Phillips	Bio-geographical ancestry	111
R. Cotton & M. Fisher	Sperm & seminal fluid properties	102
C. Børsting & N. Morling	Next generation sequencing	94
E. Romsos & P. Vallone	Rapid PCR of STR markers	118
P. Gill et al.	Historical overview of STR genotyping and interpretation	177
K. Gettings et al.	STR allele sequence variation	110
R. Just et al.	Mitochondrial DNA heteroplasmy & NGS	88
T.M. Diegoli	STR markers on the X and Y chromosomes	248
R. Ogden & A. Linacre	Wildlife forensic science & genetic geographic origin assignment	63
M. Brion et al.	Molecular autopsy & NGS	72

# Seek Contributions from Focused Meetings

From a UK Royal Society Meeting Held in London February 2015

PHILOSOPHICAL  
TRANSACTIONS B

[rstb.royalsocietypublishing.org](http://rstb.royalsocietypublishing.org)

Opinion piece



CrossMark  
click for updates

**Cite this article:** Butler JM. 2015 The future of forensic DNA analysis. *Phil. Trans. R. Soc. B* **370**: 20140252.

<http://dx.doi.org/10.1098/rstb.2014.0252>

Accepted: 26 February 2015

One contribution of 15 to a discussion meeting issue 'The paradigm shift for UK forensic science'.

## The future of forensic DNA analysis

John M. Butler

National Institute of Standards and Technology, Gaithersburg, MD, USA

The author's thoughts and opinions on where the field of forensic DNA testing is headed for the next decade are provided in the context of where the field has come over the past 30 years. Similar to the Olympic motto of 'faster, higher, stronger', forensic DNA protocols can be expected to become more rapid and sensitive and provide stronger investigative potential. New short

**Email author to request a copy**  
**[john.butler@nist.gov](mailto:john.butler@nist.gov)**

will impact the future of forensic DNA are explored including the need for education and training to improve interpretation of complex DNA profiles.

<https://royalsociety.org/events/2015/02/forensic-science/>

# A Valuable Article on Searching

*Forensic Science Review* (Jan 2015) 27: 41-52

## An Improved Forensic Science Information Search

J. Teitelbaum  
Forensic Science Library Services  
Forensic Laboratory Services Bureau  
Washington State Patrol  
Seattle, Washington  
United States of America

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- Describes a number of free resources and how to optimize searches
- Uses examples from forensic toxicology to demonstrate different types of searches
- Email author for a copy:  
[Jeff.Teitelbaum@wsp.wa.gov](mailto:Jeff.Teitelbaum@wsp.wa.gov)

**Jeff Teitelbaum** currently runs the forensic library and research services for the state of Washington's Forensic Laboratory Services Bureau, the seven-lab crime lab system of the Washington State Patrol, where he supports the information needs of over 200 forensic scientists.

# Some Free Resources for Searching



Slide from AAFS 2016 workshop (Information Does Exist Beyond the First Page of Your Google Search)

Jeff Teitelbaum "Free Forensic Science Information Resources for the Practitioner"

Available at [http://strbase.nist.gov/training/5\\_Case%20Example\\_Teitelbaum.pdf](http://strbase.nist.gov/training/5_Case%20Example_Teitelbaum.pdf)



## US National Library of Medicine

25 million citations from the biomedical literature

A screenshot of the PubMed.gov website. At the top, there is a navigation bar with "NCBI Resources" and "How To" menus, and a "My NCBI Sign In" link. Below this is the "PubMed.gov" logo and the text "U.S. National Library of Medicine National Institutes of Health". A search bar contains the text "PubMed" and has a dropdown arrow. To the right of the search bar are links for "Limits", "Advanced search", and "Help". A "Search" button and a "Clear" button are also present. Below the search bar is a large banner with a background image of a book. The banner contains the text "PubMed" and "PubMed comprises more than 19 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full-text content from PubMed Central and publisher web sites." Below the banner are three columns of links. The first column is titled "Using PubMed" and includes links for "PubMed Quick Start Guide", "Full Text Articles", "PubMed FAQs", "PubMed Tutorials", and "New and Noteworthy". The second column is titled "PubMed Tools" and includes links for "Single Citation Matcher", "Batch Citation Matcher", "Clinical Queries", and "Topic-Specific Queries". The third column is titled "More Resources" and includes links for "MeSH Database", "Journals Database", "Clinical Trials", "E-Utilities", and "LinkOut".

Slide from AAFS 2016 workshop (Information Does Exist Beyond the First Page of Your Google Search)

Jeff Teitelbaum "Free Forensic Science Information Resources for the Practitioner"

Available at [http://strbase.nist.gov/training/3\\_Free%20Resources\\_Teitelbaum.pdf](http://strbase.nist.gov/training/3_Free%20Resources_Teitelbaum.pdf)

# Lessons Learned (from Jeff Teitelbaum)

- Publicly accessible databases and search engines can be incredibly useful
- **Never rely on only one resource.** Using multiple resources is essential to quality results
- Using search operators can dramatically improve your search results
- Spend time to learn about the advanced features and techniques for each resource
- **Work to find the specific terminology used in the scientific literature.** Using PubMed search box prompts can be useful.

Slide from AAFS 2016 workshop (Information Does Exist Beyond the First Page of Your Google Search)

Jeff Teitelbaum "Free Forensic Science Information Resources for the Practitioner"

Available at [http://strbase.nist.gov/training/5\\_Case%20Example\\_Teitelbaum.pdf](http://strbase.nist.gov/training/5_Case%20Example_Teitelbaum.pdf)

# Search Tools and Strategies

- Tools and search strategies for finding forensic publications
  - **Web of Science** – multidisciplinary sciences
  - **SciFinder** – chemistry and related areas
  - **Compendex** – engineering, computer science, etc.
  - **LexisNexis** – legal and news
- Impact assessment
- Data visualization tools

*Note: The identification of any commercial product or trade name does not imply endorsement or recommendation by the National Institute of Standards and Technology.*

# Database Search Tips – Getting Started

- Write down the **key concepts** you want to focus on
- Limit to past **5 years, English** language articles, as an initial way to focus and narrow results
- As you search, **write down** synonyms, keywords, controlled vocabulary, classification codes
- Look at the number of search results – if too many, **try to narrow**
- Use **abstract and assigned keywords** to determine potential relevance

# Web of Science

- An online subscription-based resource that indexes the science and technology literature, including citations and abstracts to peer-reviewed journal articles and some conference proceedings
- Fully **covers over 8,300 journals** across 150 scientific disciplines; 1900 to present
- Analyze the sci-tech literature using “Analyze Results” and “Create Citation Report” features

# Web of Science

- When to use
  - Good starting point for any forensics topic because of its interdisciplinary coverage
  - Covers the peer-reviewed journal literature
    - Author searches to determine credibility/expertise
  - Historical coverage back to 1900
    - Early forensics research
  - Unusual topics that might not be covered in other subject-specific databases; examples include:
    - Wildlife forensics
    - Latent prints

# “Ecosystem” of Scientific Knowledge

A Question Raised or  
a Problem to Solve



**Research  
Conducted**



Results Written Up  
& Published

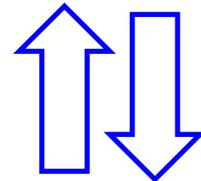


## Information Resources Available

Google Scholar  
or PubMed

Web of Science or  
Other Database

Non-Indexed  
Journals



### Crucial Elements in Search

- 1) Resources evaluated
- 2) Keywords utilized

A Question Raised or  
a Problem to Solve



***A Search is  
Conducted***



**Results  
Obtained**

# NSF/NIJ-Funded 2015 Workshop



National Institute of Justice

**Forensic Science Research and Evaluation Workshop:**  
A Discussion on the Fundamentals of Research Design and an Evaluation  
of Available Literature

May 26–27, 2015  
Washington, D.C.

**NCJ 250088**

**Forensic Science Research Evaluation**

Edward G. Bartick and McKenzie Floyd, Eds.

- Meeting was held at the AAAS headquarters (Washington, DC) on May 26-27, 2015
- Some relevant articles:
  - “Impact of forensic literature on the admissibility process” (Michael T. Ambrosino)
  - “Policy implications of inadequate literature” (Ronald N. Kostoff)
  - “A quality and gap analysis: an AAAS forensic science literature project” (Deborah Runkle)
  - “How do we trust the scientific literature?” (Simon A. Cole)

**NSF-funded Workshop; available through NIJ**  
<https://www.ncjrs.gov/pdffiles1/nij/250088.pdf>

# **Storing & Retrieving the Literature**

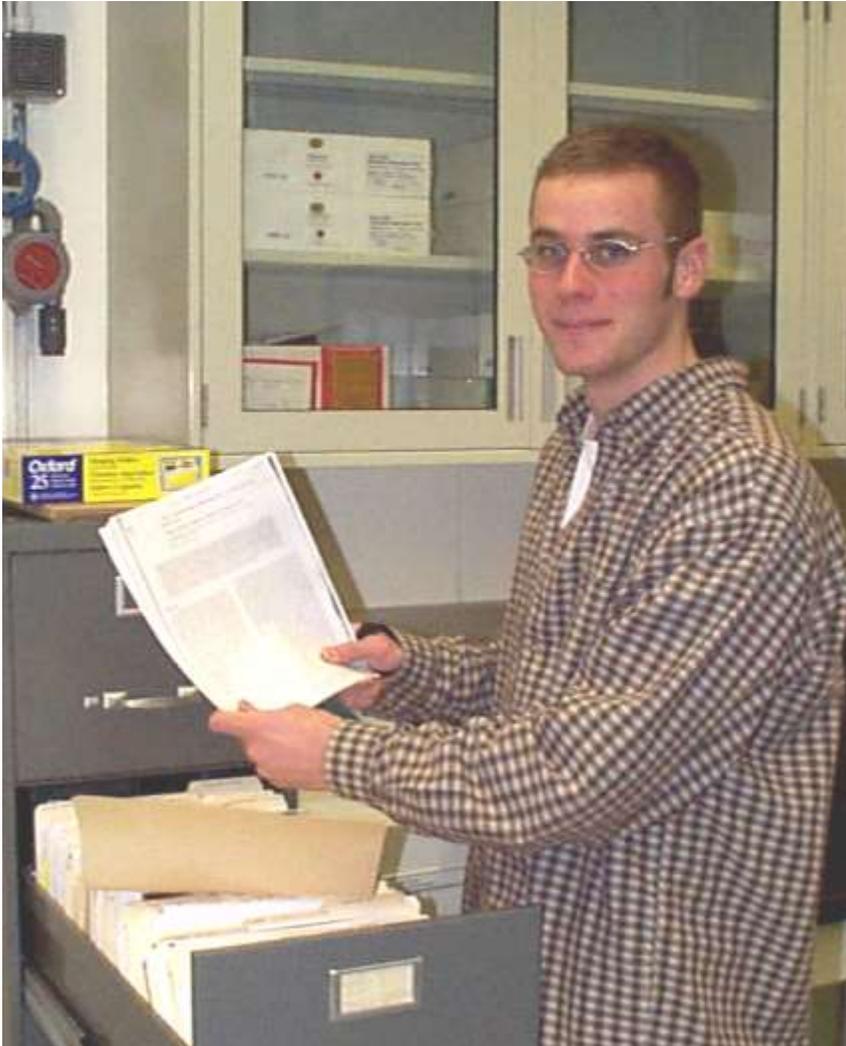
# Curation of Collected Articles

- I collect digital copies of articles and have dedicated folders on my desktop computer
- I prefer to read an article from a printed copy so that I can make notes on it
- Do you have piles of paper in your office?
  - If so, how do you find information when you need it later?
- Do you have an organized filing system that enables efficient retrieval of articles and information you have collected in the past?
  - Upfront curation and classification will improve retrieval

# Do You Use a “File Pile” Filing System?



# Creating a Reference Collection



- My forensic DNA reference collection began while I was in graduate school
  - Continued over the years with the help of student interns like Christian Ruitberg shown here
- Mostly printed copies of articles are stored
  - has increasingly become digital (this part is not as well organized)

# Reference Management Systems

THOMSON REUTERS

contact us | about us | what's new | product info | support & services | purchase | home

Save on Volume licenses  
Discounts on 20+ copies (new and upgrade)

What's New  
Get the latest Styles and Files

Quick Links

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- Article information storage and search retrieval
- Reference formatting for different journals

**Develop a system and strategy that works for you to store information**

# Reference Manager Database

As of Aug 2013: 5115 references in **AllRef** and 3683 references in **STR\_Ref**

The screenshot shows the Reference Manager 11 interface. The top menu bar includes File, Edit, View, References, Tools, Window, and Help. Below the menu is a toolbar with various icons for file operations and editing. The main window is divided into two panes. The left pane displays a list of references with columns for Ref ID, Authors, and Title. The right pane shows a detailed view of a selected reference, including its title, authors, publication date, and a link to the full-text. A large yellow banner with red text is overlaid on the right pane, stating '8,798 references cataloged'. A diagonal yellow banner with red text is overlaid across the bottom of the interface, stating 'UPDATED NOW WITH ENDNOTE'. The detailed view of the selected reference (Ref ID 2625) includes the following information:

Ref Type*	Journal
Ref ID*	2625
Title	Genetics and genomics of core short tandem repeat loci used in human identity testing
Authors	Butler, J.M.;
Pub Date*	2006
Web/URLs	<a href="http://PM:165866758">PM:165866758</a>
File Attachments	
Link to Full-text	
Related Links	
Image(s)	
Notes	DA - 20060328 IS - 0022-1198 (Print) LA - eng PT - Journal Article PT - Review

The reference list at the bottom shows the following entries:

Ref ID	Authors	Title
<input type="checkbox"/> 2153	Butler, J.M.	Forensic DNA typing using the ABI Prism 310 and 3100 genetic analyzers for STR analysis
<input type="checkbox"/> 2201	Butler, J.M.	Duplication of the Y chromosome and its impact on the interpretation of STRs from parts of the Y chromosome
<input type="checkbox"/> 2461	Butler, J.M.	Characterization and typing of Y-chromosome short tandem repeat markers
<input type="checkbox"/> 2477	Butler, J.M.	Characterization of Y-chromosome short tandem repeat markers and their potential impact on Y-STR interpretation
<input type="checkbox"/> 2492	Butler, J.M.	Characterization of Y-chromosome short tandem repeat markers for the multi-copy Y-STR locus DYS464
<input type="checkbox"/> 2550	Butler, J.M.	Allele frequencies for 27 Y-STR loci with U.S. Caucasian, African American, and Hispanic samples
<input checked="" type="checkbox"/> 2625	Butler, J.M.	Genetics and genomics of core short tandem repeat loci used in human identity testing
<input type="checkbox"/> 3015	Butler, J.M.	Short tandem repeat typing technologies used in human identity testing
<input type="checkbox"/> 3035	Butler, J.M.	STRs vs. SNPs: thoughts on the future of forensic DNA testing

# Benefits of Using a Reference Management Software Program

1. Enables connection to pdf files or indexing of paper records
2. Enables searching and storage of literature citations in a common format
3. Enables easy formatting of references for different journal styles

# Strategies for Scientific Literature Collection and Curation

- **Use electronic papers only**
  - a standard file naming system will benefit retrieval
  - challenge of storing different files on different computers
- **Put everything into a single file (e.g., AllRef)**
  - use keywords or authors to find specific articles
- **Create separate files for individual projects**
  - classification problems can arise if an article could possible fit into multiple projects

# Fruits of a Good Literature Collection

## Review Articles

*J Forensic Sci*, March 2006, Vol. 51, No. 2  
doi:10.1111/j.1556-4029.2006.00046.x  
Available online at: [www.blackwell-synergy.com](http://www.blackwell-synergy.com)

John M. Butler,<sup>1</sup> Ph.D.

Genetics and Genomics of Core Short Tandem Repeat Loci Used in Human Identity Testing

*Anal. Chem.* 2007, 79, 4385–4384

**Analytical Chemistry (June 15, 2007 issue)**

### **Forensic Science**

**T. A. Brettell\***

*Department of Chemical and Physical Sciences, Cedar Crest College, 100 College Drive, Allentown, Pennsylvania 18104-6196*

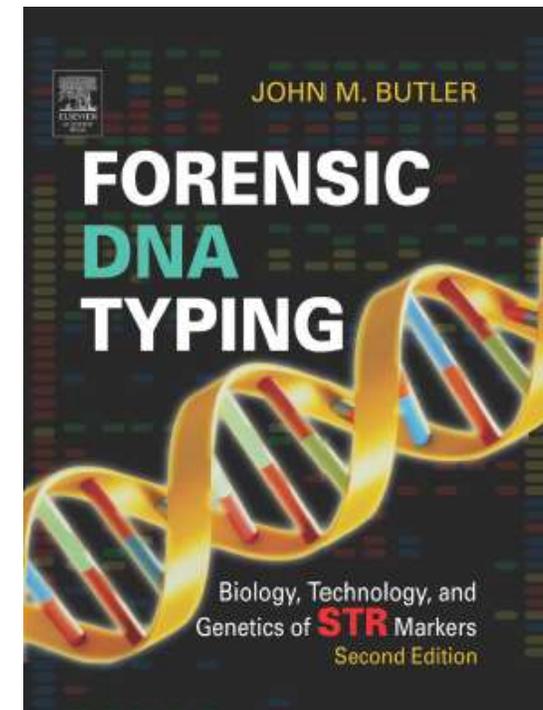
**J. M. Butler**

*Biochemical Science Division, National Institute of Standards and Technology, Gaithersburg, Maryland 20899-8311*

**J. R. Almirall**

*Department of Chemistry and Biochemistry and International Forensic Research Institute, Florida International University, University Park, Miami, Florida 33199*

## Textbooks



**2<sup>nd</sup> Edition** 688 pp.  
**Feb 2005**

# Butler Books on **Forensic DNA Typing**

*Fairly comprehensive reference citations are provided  
with each topic and chapter*

Publication  
Year

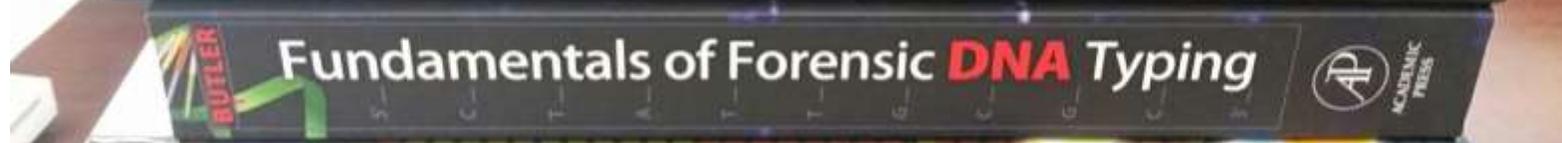
2015



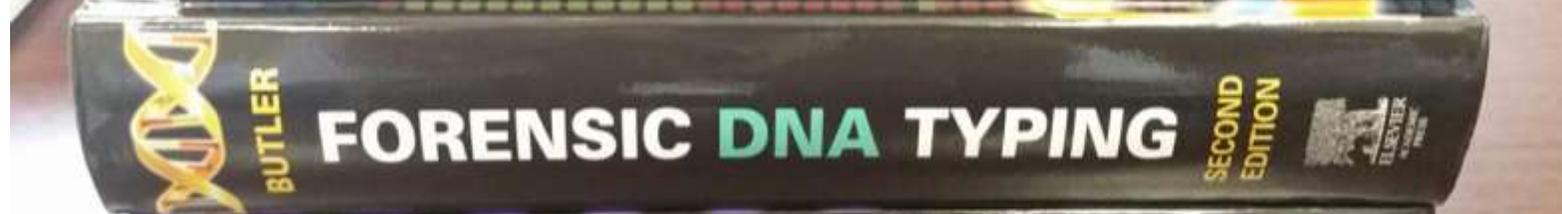
2012



2010



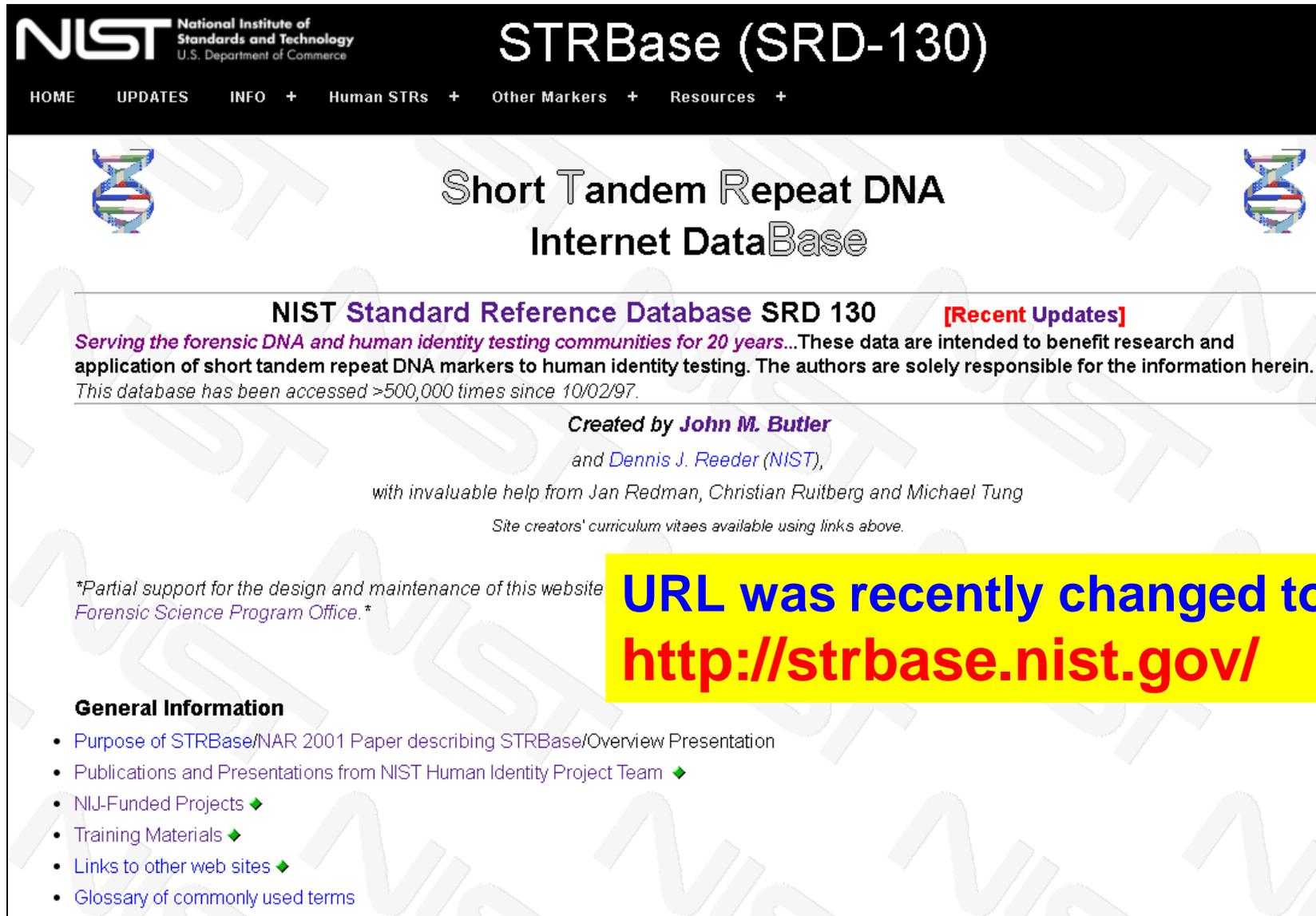
2005



2001



# And a Useful Reference Website...



**NIST** National Institute of Standards and Technology  
U.S. Department of Commerce

## STRBase (SRD-130)

HOME    UPDATES    INFO +    Human STRs +    Other Markers +    Resources +



### Short Tandem Repeat DNA Internet DataBase



---

**NIST Standard Reference Database SRD 130**    **[Recent Updates]**

*Serving the forensic DNA and human identity testing communities for 20 years...* These data are intended to benefit research and application of short tandem repeat DNA markers to human identity testing. The authors are solely responsible for the information herein. *This database has been accessed >500,000 times since 10/02/97.*

---

Created by **John M. Butler**  
and **Dennis J. Reeder (NIST)**,  
with invaluable help from Jan Redman, Christian Ruitberg and Michael Tung  
*Site creators' curriculum vitae available using links above.*

*\*Partial support for the design and maintenance of this website  
Forensic Science Program Office.\**

**URL was recently changed to  
<http://strbase.nist.gov/>**

---

**General Information**

- [Purpose of STRBase/NAR 2001 Paper describing STRBase/Overview Presentation](#)
- [Publications and Presentations from NIST Human Identity Project Team](#) ◆
- [NIJ-Funded Projects](#) ◆
- [Training Materials](#) ◆
- [Links to other web sites](#) ◆
- [Glossary of commonly used terms](#)

# Reading Scientific Articles

# Why Read the Literature?

- Reading the relevant literature is crucial to developing expertise in a scientific field
- You must keep reading to be familiar with advances that are regularly being made
- **Your writing improves the more you read**
  - Being widely read in your field helps you prepare **relevant reference** lists and **insightful introductions** to your submitted manuscripts *or in your internal validation summaries*
- **Your ability to review other's work will improve...**
  - Being widely read in your field helps you be better able to critique different papers and to design better experiments (e.g., you can go back to well-designed studies for examples)
  - ***Remember that just because something is published does not mean that it is necessarily the “best” work or completely relevant to what you may be doing***

## Perspective on Requirements for Being a Forensic Science Expert

“It is a clear expectation of the courts that expert evidence is presented by people who are indeed experts in their field. This necessitates **an up to date knowledge of developments in the relevant field**, which in turn necessitates **access to scientific literature** and **sufficient time** to ensure that each expert has the current relevant knowledge that they need.”

- **Dr. Gillian Tully**, UK Forensic Science Regulator (*Annual Report 2017*, p. 10; published 19 Jan 2018)



## Greg Matheson on Forensic Science Philosophy

The CAC News – 2<sup>nd</sup> Quarter 2012 – p. 6

“Generalist vs. Specialist: a Philosophical Approach”

<http://www.cacnews.org/news/2ndq12.pdf>

“If you want to be a technician, performing tests on requests, then just focus on the policies and procedures of your laboratory. If you want to be a scientist and a professional, learn the policies and procedures, but go much further and learn the philosophy of your profession. **Understand the importance of why things are done** the way they are done, the scientific method, the viewpoint of the critiques, the issues of bias and the importance of ethics.”

# Forthcoming FBI DNA Quality Assurance Standards

## 16.1.2 (2020 version) Requirement for Literature Review

**STANDARD 16.1** The laboratory shall have and follow a program to ensure technical qualifications are maintained through **participation in continuing education**.

**16.1.1** ...analyst(s)...shall stay abreast of topics relevant to the field of forensic DNA analysis **by attending seminars...in relevant subject areas for a minimum of eight (8) cumulative hours each calendar year**.

**16.1.2** The laboratory shall have and follow a program approved by the technical leader for the annual review of scientific literature that documents the analysts' **ongoing reading of scientific literature**.

**16.1.2.1** The laboratory shall maintain or have physical or electronic access to a collection of current books, reviewed journals, or other literature applicable to DNA analysis.

# Challenges the Forensic DNA Community Faces with Continuing Education

- **QAS requirement for continuing education are only a start**
  - Minimum of eight (8) hours per year for seminars and one (1) or more articles to read will not cover much ground
  - **How does anyone know if you learned anything since there is no assessment of what was learned?**
  - **For example, which articles are essential for you to understand to be an expert in DNA mixture interpretation?**
- **Rapid and continuous evolution of the field**
  - New STR kits, new CE instruments, new software, new potential approaches for analysis (e.g., NGS) and interpretation (e.g., probabilistic genotyping software)
  - **There are lots of articles to chose from based on interest or need...**
- **Numerous articles are being published each year**
  - **Which articles should you choose to study?**

# Access to the Literature

- Most universities provide electronic and physical access to a wide variety of scientific journals
- Some forensic laboratories may be limited in what they have available
  - Share individual subscription copies with the laboratory
  - Use free Open Access articles (when available)
  - Email article authors to request an electronic copy of their publication

# Benefits of Reading the Literature

- You become familiar with authors and institutions
- You can improve as a writer and a presenter
- Your laboratory can improve its protocols
- Over time you will be building your knowledge
  - In graduate school, I read over 100 articles on PCR before I ever did a single experiment
  - I have gathered and cataloged ~10,000 articles over the last 25 years of work in the forensic DNA field
  - My books include reference lists that are as comprehensive as possible (because of this reference collection)
- Remember: **You don't have to master every paper...**

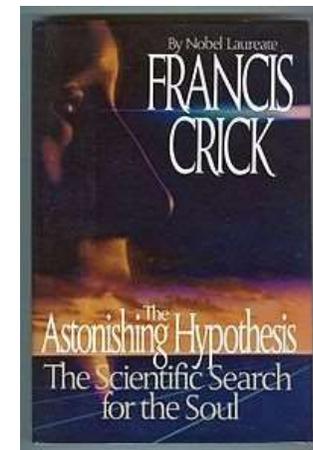
**How many scientific articles have you read recently?**

<http://www.biography.com/people/francis-crick-9261484>



# Francis Crick

*The Astonishing Hypothesis* (1994), page xiii



“There is no form of prose more difficult to understand and more tedious to read than the average scientific paper.”

# The “IMRAD” Format to Scientific Articles

- Introduction – what question is being studied?
- Methods (& Materials) – how study was performed?
- Results – what were the findings in the study?
- And
- Discussion – what do these findings mean?

- **The first scientific journals appeared in 1665** but early articles were descriptive in nature
- The IMRAD approach began to be used in the mid-20<sup>th</sup> century to focus articles and to make indexing and reviewing easier
- **IMRAD was formally defined in 1979** by the American National Standards Institute (ANSI Z39.16-1979) “American National Standard for the Preparation of Scientific Papers for Written or Oral Presentation”

# How to Read a Scientific Article

- Skim the article first
  - Start with title and abstract (may consider authors as well)
  - Scan tables, figures and figure captions
- Examine results and conclusions
  - Do the data presented support the statements made?
- Do not worry about trying to comprehend the entire article at first
  - Most articles will be skimmed rather than read from start to finish
  - **Many articles are never read in detail**
- **Highlight key points and make notes on the paper** itself so you can go back to them later to refresh your memory

John Butler's perspective and not a formal standard!

# Read Print or Electronic Format?

- **I prefer articles in print format to read them** because I like to mark meaningful passages and make notes in the margins for future use
- I do download and store articles electronically as pdf files (often for future printing purposes)
  - I typically name my files with the following format: **First Author's Last Name / Publication Date / Journal / Title or Brief Description** (e.g., “**Butler 2006 J Forensic Sci – genetics and genomics of STR markers.pdf**”)

# Different Types of Articles

- Original research articles
- Review articles
- Short communications (termed “technical notes” in *JFS*)
- Book reviews
- Case studies (termed “case reports” in *JFS*)
- Opinion or commentary
- Letters to the Editor
  - typically correcting or commenting on a previous publication
- With *FSI Genetics*: Forensic population genetics (original paper, short communication, or correspondence)

**Different journals can have different categories and/or required structures for manuscript submission**

# Journal Clubs

- A journal club is a group of individuals who meet regularly (in person, online, or both) **to critically evaluate recent articles** in the academic literature (*Wikipedia*)
- **Do you have one in your laboratory?**
- **How often do you meet? Is it effective?**
- We can learn from how the medical profession has conducted journal clubs as a method to learn from colleagues
  - Deenadayalan, Y., et al. (2008) How to run an effective journal club: a systematic review. *Journal of Evaluation in Clinical Practice* 14(5): 898-911

# Selecting What to Read is Important

- Review entire journal listing of articles
  - Examine journal issue or view table of contents on-line
- Perform directed searches on specific topics
  - PubMed <http://www.ncbi.nlm.nih.gov/PubMed>
- Sign up for table of contents delivery via email
- **Examine publications cited in review articles**
  - You are trusting someone else (that you respect) to provide your reading list

(2013-2016)



**18<sup>th</sup> INTERPOL International  
Forensic Science Managers  
Symposium  
Lyon, France**

11-13 October 2016  
Review Papers

EDITED BY:  
DR. MAX M. HOUCK, FRSC  
MANAGING DIRECTOR, FORENSIC & INTELLIGENCE SERVICES  
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[MAX@FORENSICINTELLIGENCE.US](mailto:MAX@FORENSICINTELLIGENCE.US)



# 3-year Review of Forensic Science Literature

- Interpol holds a forensic science symposium **every three years** that involves a review of literature in multiple forensic disciplines
- With the last cycle of reviews in 2016, **17 topics** are reviewed by **authors from countries around the world** that cover a total of **4891 reference citations**
- A 769 page (8.5 MB) pdf file

Available on the INTERPOL website at

<https://www.interpol.int/content/download/33314/426506/version/1/file/INTERPOL%2018th%20IFSMS%20Review%20Papers.pdf>

# 2013-2016 INTERPOL Literature Summary

<https://www.interpol.int/content/download/33314/426506/version/1/file/INTERPOL%2018th%20IFSMS%20Review%20Papers.pdf>

Topic	Authors (affiliations)	# References
<b>Firearms</b>	Erwin J.A.T. Mattijseen (Netherlands Forensic Institute)	179
<b>Forensic Geosciences</b>	Lorna Dawson (James Hutton Institute, Aberdeen, UK)	245
<b>Gun Shot Residue</b>	Sébastien Charles, Bart Nys, Nadia Geusens (INCC-NICC Brussels, Belgium)	77
<b>Marks</b>	Martin Baiker (Netherlands Forensic Institute)	104
<b>Paint and Glass</b>	Jose Almirall (Florida International University, USA)	102
<b>Fibers and Textiles</b>	Laurent Lepot, Kris De Wael, Kyra Lunstroot (INCC-NICC Brussels, Belgium)	92
<b>Fire Investigation &amp; Debris Analysis</b>	Eric Stauffer (University of Lausanne, Switzerland)	194
<b>Explosives</b>	Douglas J. Klapec and Greg Czarnopys (ATF Laboratory, USA)	646
<b>Drugs</b>	Robert F.X. Klein (Drug Enforcement Administration Laboratory, USA)	1434
<b>Toxicology</b>	Wing-man Lee, Kwok-leung Dao, Wing-sum Chan, Tai-wai Wong, Chi-wai Hung, Yau-Nga Wong, Lok-hang Tong, Kit-mai Fung, Chung-wing Leung (Hong Kong Government Laboratory, China)	600
<b>Audio</b>	Catalin Grigoras, Andrzej Drygajlo, Jeff M. Smith (University of Colorado-Denver, USA and École Polytechnique Fédérale de Lausanne, Switzerland)	88
<b>Video and Imaging</b>	Arnout Ruifrok, Zeno Geradts, (Netherlands Forensic Institute)	108
<b>Digital Evidence</b>	Paul Reedy (Department of Forensic Science, District of Columbia, USA)	100
<b>Fingermarks and Other Impressions</b>	Andy Bécue and Christophe Champod (University of Lausanne, Switzerland)	536
<b>DNA and Biological Evidence</b>	Francois-Xavier Laurent and Laurent Pene (Institut National de Police Scientifique, Cedex, France)	75
<b>Questioned Documents</b>	Julien Retailleau (IRCGN, Pontoise, France)	255
<b>Forensic Science Management</b>	William P. McAndrew (Gannon University, Erie, PA, USA) and Max M. Houck (Forensic & Intelligence Services LLC, USA)	56

**4891 references provided**

# Forensic DNA Review for INTERPOL 2016-2019

- Written in July 2019 by John M. Butler and Sheila Willis
- **Examines 235 articles** published in 35 different journals
- Topics covered
  - Core STR loci expansion
  - Rapid analysis of STR markers
  - Investigative genetic genealogy
  - Next-generation sequencing
  - DNA mixture interpretation and probabilistic genotyping software
  - DNA transfer and activity level evaluations
  - Forensic biology and body fluid identification
  - DNA phenotyping
  - Privacy and ethical issues
  - Guidance documents
  - Contamination avoidance and DNA success rates
  - Recent special issues and review articles of note

# A Recent Review Article on Forensic DNA

**analytical chemistry** *Analytical Chemistry* 2019, 91, 673-688 Review  
Cite This: *Anal. Chem.* 2019, 91, 673-688 [pubs.acs.org/ac](https://pubs.acs.org/ac)

**246 references cited**

**Forensic DNA Analysis**

Bruce R. McCord,<sup>\*,†</sup> Quentin Gauthier,<sup>†</sup> Sohee Cho,<sup>‡</sup> Meghan N. Roig,<sup>†</sup> Georgiana C. Gibson-Daw,<sup>†</sup> Brian Young,<sup>||</sup> Fabiana Taglia,<sup>†</sup> Sara C. Zapico,<sup>†</sup> Roberta Fogliatto Mariot,<sup>†</sup> Steven B. Lee,<sup>⊥</sup> and George Duncan<sup>†</sup>

<sup>†</sup>Department of Chemistry, Florida International University, Miami, Florida 33199, United States  
<sup>‡</sup>Department of Forensic Medicine, Seoul National University, Seoul, 08826, South Korea  
<sup>||</sup>Niche Vision, Inc., Akron, Ohio 44311, United States  
<sup>⊥</sup>Forensic Science Program, Justice Studies Department, San Jose State University, San Jose, California 95192, United States

Forensic serology  
Chemical & spectroscopic methods  
Body fluid identification via RNA typing  
Proteomic body fluid identification  
Epigenetics  
DNA extraction & sample recovery  
Genotyping methods using STRs  
Mixtures and probabilistic genotyping  
Estimating the number of contributors

Y-STRs and X-STRs; Y-SNPs and X-SNPs  
SNPs; Insertion/Deletions; Mitochondrial DNA  
Ancient DNA, bones, and teeth  
Improving DNA extractions from teeth and bone  
Nonhuman DNA; Wildlife forensics  
Drug sourcing  
Massively parallel sequencing  
The microbiome as a source of DNA  
Postmortem interval

**BREAK**

10:30 – 11:00

# **Reviewing Scientific Articles**

# Why do Reviewers review?

GIVE	TAKE
Academic 'duty'	Updated with latest developments
	Helps with own research or new ideas
	Career development
	Awareness of new research before their peers
	General interest in the area
	Builds association with journals and Editors

# The Peer-Review Process

## Based on My Perspective as an Editor

- Authors write article according to journal guidelines (each journal has an “Instructions for Authors”)
- Steps during review
  - Article submitted to journal by corresponding author
  - Assigned to an editor
  - Editor asks 2 or more scientists to review the article in a specific timeframe (usually 2-3 weeks)
  - Editor takes reviews into consideration and responds to author with **Accept, Revise, or Reject**; **“Revise” is most common**
  - Author revises article and resubmits it for another review

**Unfortunately, busy scientists often do not complete their reviews in a timely fashion (requiring the editor to remind them)**

# If Asked to Review...

- Respond quickly with a “yes” or “no” and **be honest** if you cannot complete the review in the requested time period (usually 2 to 3 weeks)
- If the topic is outside your expertise or you think there may be a potential conflict of interest, then you should decline to perform a review on the requested submission
- Helpful to know that you (as a potential reviewer) are out of the office so an editor can avoid inviting you during this time period
  - For some journals, it is possible to alert editors by putting a note in your reviewer on-line profile

# Declining to review



**58%** paper outside my area of expertise



**49%** too busy doing own research, lecturing, etc.



**30%** too many prior reviewing commitments



**20%** personal reasons

(Source: Peer Review Survey 2009)

**If you decline, your suggestions for an alternative reviewer are appreciated**

# Qualities of a Good Reviewer

...“Good reviewers provide **objective feedback** to editors and **constructive comments** to authors.”

Forensic Science International: Genetics Supplement Series 4 (2013) e115–e116



Contents lists available at [ScienceDirect](#)

Forensic Science International: Genetics Supplement Series

journal homepage: [www.elsevier.com/locate/FSIGSS](http://www.elsevier.com/locate/FSIGSS)



The triad of scientific publication: Reading, writing, and reviewing

John M. Butler\*

National Institute of Standards and Technology, Gaithersburg, MD, USA



# Qualities of a Good Reviewer

- Objective
- Thorough and constructive feedback to editor and authors
  - Clear recommendation to the editor
  - Collegial comments to the authors
  - The more detail, the better to improve the article during a revision process
- **Review completed in the requested timeframe**
- Keep contents confidential following review
  - Destroy copy of manuscript
- **If you were the author of the article, how would you like a reviewer to treat you?**

Your review should be  
more descriptive than this example...

**“This paper contains much that is new  
and much that is true. Unfortunately, **that  
which is true is not new** and **that which is  
new is not true.**”**

- Attributed as a referee's report in H. Eves, *Return to Mathematical Circles* (1988). Also attributed to a 19-th century scientist commenting on one of his competitor's papers, cited in I. M. Klotz, 'How to become famous by being wrong in science', *International Journal of Quantitative Chemistry*, **24**, 881-890, which is quoted in Frederick Grinnell, *Everyday Practice of Science* (2008), 86.

# Some Logistics of Reviewing

- I like to **print out the article** so that I can mark corrections and comments on it
- I first **skim** the article to get an idea of the topic and scope involved
- I review the **title, abstract, and conclusions** first
- I check the **reference list** for consistency and format
- I examine the **Materials and Methods** to see if sufficient detail is present
- I **read text and examine figures and tables** carefully and mark comments on the article
- I **type up my comments** and provide them to the editor with a recommendation for acceptance, revision or rejection

# Writing Your Review

- Provide a **brief summary of the article's purpose**
- Provide a **recommendation to the editor** (acceptance, revision, or rejection)
- Provide support for your recommendation through **specific comments** addressed to the authors
- Include **major concerns first** then cover minor issues
- Some changes may be essential and others just suggestions to improve the manuscript (make concerns clear to authors)
  - A reviewer should not copy-edit the manuscript if English grammar needs significant work (just state concern with the readability of the text and perhaps recommend rejection)

# Requesting Additional Experiments

- Remember that this article is not your work...
- Ask and address the question: **“Did the authors adequately set up their study and would their study require any extra work to support their conclusions?”**

# Questions about Tables and Figures

- Appropriate
  - Are they necessary? Do they add value to the article? Are there too many or too few?
- Understandable
  - Are they easy to understand?
  - Does a figure need color to make it clear?
  - Are captions complete?
  - Are sizes of figures appropriate for what is being shared?
  - Are the quality and readability of the image sufficient?
  - Are figures consistent across the manuscript in terms of font size and style, legends, and axes?

# Additional Areas to Examine

- Conclusions
  - Sometimes authors include unjustified claims or make generalizations that are not supported by their results (i.e., they over extrapolate their conclusions)
- References
  - Are they appropriate, up-to-date, too many self-citations, or too few citations?

**In my opinion, reviewers should not ask for authors (as part of the review) to cite the reviewer's work!**

# Do's and Don'ts of the Review Process

## Do

- 1) Provide clear comments to authors
- 2) Be consistent with comments to authors and editor
- 3) Provide specific references to text to support your critiques
- 4) Reread your review to ensure you are not too harsh
- 5) Treat authors of a manuscript as your equal independent of quality

## Do Not

- 1) State in your comments to the authors your recommendation to the editor
- 2) Praise manuscript in authors comments and disparage it in confidential comments to editor
- 3) Make vague text references or opinions not supported by data
- 4) Send off your review without looking over it at least once
- 5) Talk down to authors (remember that science is a collaborative process)

# 2017 Review of Peer-Review

Review Article

*Forensic Science International* 2017, 277, 66-76

## Peer review in forensic science

Kaye N. Ballantyne<sup>a,b,\*</sup>, Gary Edmond<sup>c</sup>, Bryan Found<sup>a,c</sup>

<sup>a</sup> Office of the Chief Forensic Scientist, Victoria Police Forensic Services Department, Macleod Victoria, Australia

<sup>b</sup> School of Psychology and Public Health, La Trobe University, Bundoora, Victoria, Australia

<sup>c</sup> Program in Expertise, Evidence and Law, Faculty of Law, University of New South Wales, Kensington 2052, Australia

- Examines different types of peer-review (editorial, scientific community, technical & administrative, verification & replication)
- Describes how forensic practitioners should approach and use peer-review and how it should be described in expert reports and testimony
- **Key Finding:** “While peer-review has considerable potential, and is a key component of modern quality management systems, its actual value in most forensic science settings has yet to be determined.”

# **Writing**

## **Scientific Articles**

# Why You Need to Write Up Your Work

- Peer-review usually generates higher-quality information (but the quality control is not perfect)
- Talks are not held to the same standard as a written publication (that has been peer-reviewed)
- A written publication is also accessible to those who did not attend a presentation and is archived for future scientists to read

# ***Think of a paper that you enjoyed reading***

## ***What are the qualities that made it worth reading?***

- Interesting title
- Concise and to the point
- New information
- Case work information
- Easy to understand
- New solutions to problems
- Short statements
- Short articles with good findings
- If you want to reproduce a method, then you appreciate the detail
- Articles that inspire you (new fields that are discovered)

***To Be Completed during the Workshop***

# ***Think of a paper that you enjoyed reading***

## ***What are the qualities that made it worth reading?***

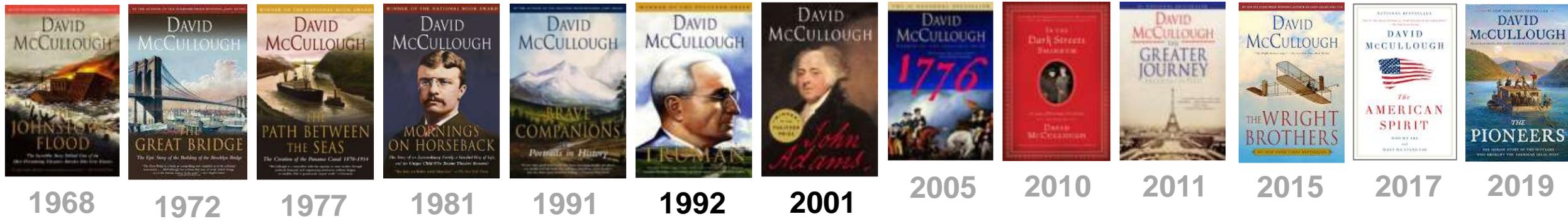
- The flow and connections in the paper
- Interesting and relevant to my lab
- Clear and organized ideas
- All papers from Charles Brenner
- Writing in shorter sentences
- Understandable
- Informative figures and tables
- When you can figure out what is next
- Bad: leaving out equations and important details
- Give examples in the paper

***Provided during my 2017 Workshop***

# Who is Your Audience?

## When You Write a Scientific Paper

- Other scientists
  - Your colleagues (those in the same field – e.g., forensic genetics)
  - Scientists reading outside their discipline (e.g., molecular biologists)
  - Students who are just getting started in the field
  - Non-native English speaking scientists
- In some cases, members of the general public such as journalists or lawyers



*Pulitzer Prize winning books*

“Writing is thinking. **To write well is to think clearly.** That's why it's so hard.”

David McCullough



–David McCullough, Pulitzer Prize winner

(<http://www.neh.gov/about/awards/jefferson-lecture/david-mccullough-interview>)

# Training in Scientific Writing is Needed

“To expect scientists to produce readable work without any training, and without any reward for success or retribution for failure, is like expecting us to play violins without teachers or to observe speed limits without policemen. Some may do it, but most won't or can't.”

- **Martin W. Gregory** (1992) “The infectiousness of pompous prose”, *Nature* 360: 11-12



ANSI/NISO Z39.18-2005 (R2010)

ISSN: 1041-5653

## Scientific and Technical Reports – Preparation, Presentation, and Preservation

---

**Abstract:** This Standard outlines the elements, organization, and design of scientific and technical reports, including guidance for uniform presentation of front and back matter, text, and visual and tabular matter in print and digital formats, as well as recommendations for multimedia reports.

An American National Standard  
Developed by the  
National Information Standards Organization

Approved: July 27, 2005  
by the  
American National Standards Institute  
Reaffirmed May 13, 2010

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Published by the National Information Standards Organization  
Baltimore, MD

# How to Write a Report or Scientific Publication

From the National Information Standards Organization

**Abstract:** This Standard outlines the elements, organization, and design of scientific and technical reports, including guidance for uniform presentation of front and back matter, text, and visual and tabular matter in print and digital formats, as well as recommendations for multimedia reports.

*“Its purpose is to foster uniformity in reports for ease of information retrieval while permitting diversity in presentation based on the rapidly changing environment driven by the growing digital environment.”*

# Some Helpful Resources

- Whitesides, G.M. (2004). Whitesides' group: writing a paper. *Advanced Materials*, 16, 1375-1377. Available at <http://gmwgroup.harvard.edu/pubs/pdf/895.pdf>.
- **Day, R.A. (1998). *How to Write & Publish a Scientific Paper, 5<sup>th</sup> edition*. Oryx Press: Phoenix, Arizona. [8<sup>th</sup> edition was published in 2016]**
- *BioTechniques* July & August 2013 special series on manuscript tips: <http://www.biotechniques.com/news/> [search "manuscript tips"]
- Gopen, G.D., & Swan, J.A. (1990). The science of scientific writing. *American Scientist*, 78, 550-558.



# George Whitesides

## on How to Write a Scientific Article

*Adv. Mater.* (2004) 16(15): 1375-1377

ADVANCED  
MATERIALS

ESSAY

## Whitesides' Group: Writing a Paper\*\*

By *George M. Whitesides\**

### 1. What is a Scientific Paper?

A paper is an organized description of hypotheses, data and conclusions, intended to instruct the reader. Papers are a central part of research. If your research does not generate papers, it might just as well not have been done. “Interesting and unpublished” is equivalent to “non-existent”.

Realize that your objective in research is to formulate and test hypotheses, to draw conclusions from these tests, and to teach these conclusions to others. Your objective is not to “collect data”.

A paper is not just an archival device for storing a com-

do *not* agree on the outline, any text is useless. Much of the *time* in writing a paper goes into the text; most of the *thought* goes into the organization of the data and into the analysis. It can be relatively efficient in time to go through several (even many) cycles of an outline before beginning to write text; writing many versions of the full text of a paper is slow.

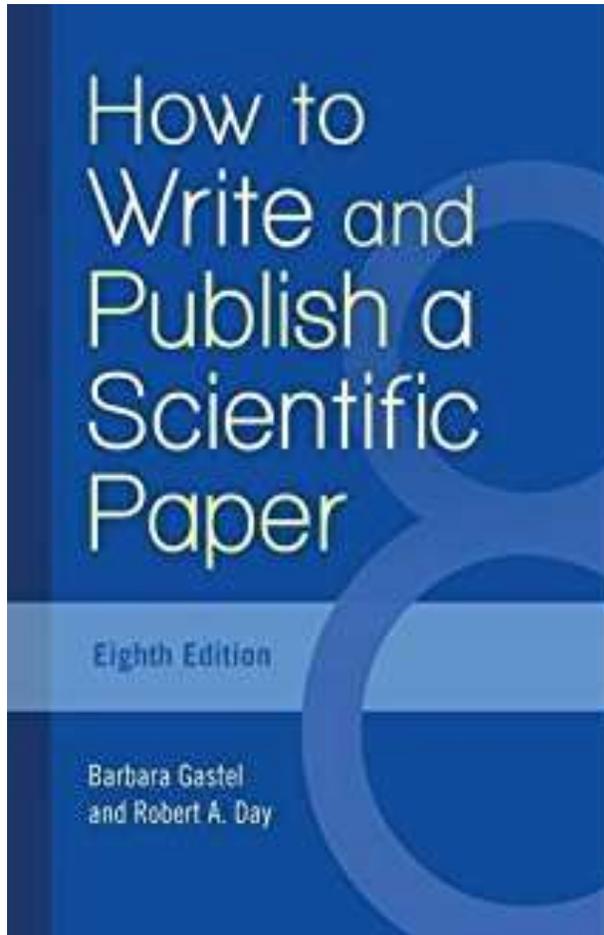
All writing that I do—papers, reports, proposals (and, of course, slides for seminars)—I do from outlines. I urge you to learn how to use them as well.

### 2.2. How Should You Construct an Outline?

**author of more than 1290 scientific articles and 147 patents with an *h*-index of probably >200 (as of Aug 2017)**

should write and rewrite these plans/outlines throughout the what hypotheses did I mean to test? ; what ones did I

# Robert A. Day's “How to Write & Publish a Scientific Paper” is a Classic



- 1<sup>st</sup> edition (1979)
- 2<sup>nd</sup> edition (1983)
- 3<sup>rd</sup> edition (1988)
- 4<sup>th</sup> edition (1994)
- **5<sup>th</sup> edition (1998)**
- 6<sup>th</sup> edition (2006)
- 7<sup>th</sup> edition (2011)
- 8<sup>th</sup> edition (2016)

Co-authored  
now with  
**Barbara Gastel**  
(Texas A&M)

Robert A. Day is Professor Emeritus of English at the University of Delaware

# *How to Write & Publish a Scientific Paper (5<sup>th</sup> edition)*

## **Table of Contents**

1. What is Scientific Writing?
  2. Origins of Scientific Writing
  3. What is a Scientific Paper?
  4. How to Prepare the Title
  5. How to List the Authors and Addresses
  6. How to Prepare the Abstract
  7. How to Write the Introduction
  8. How to Write the Materials and Methods Section
  9. How to Write the Results
  10. How to Write the Discussion
  11. How to State the Acknowledgments
  12. How to Cite the References
  13. How to Design Effective Tables
  14. How to Prepare Effective Graphs
  15. How to Prepare Effective Photographs
  16. How to Keyboard the Manuscript
  17. Where and How to Submit the Manuscript
  18. The Review Process (How to Deal with Editors)
  19. The Publishing Process (How to Deal with Proofs)
  20. Electronic Publishing Formats
  21. The Internet and WWW
  22. The Electronic Journal
  23. E-mail and Newsgroups
  24. How to Order and Use Reprints
  25. How to Write a Review Paper
  26. How to Write a Conference Report
  27. How to Write a Book Review
  28. How to Write a Thesis
  29. How to Prepare a Paper Orally
  30. How to Prepare a Poster
  31. Ethics, Rights, and Permissions
  32. Use and Misuse of English
  33. Avoiding Jargon
  34. How and When to Use Abbreviations
  35. A Personalized Summary
- also 7 Appendices, a Glossary, and Reference List

# ***BioTechniques* Special Series: Manuscript Tips**

from Nathan Blow, editor-in-chief, July & August 2013

<http://www.biotechniques.com/news/>

- 1) Abstracts – Part 1 07/16/2013
- 2) Abstracts – Part 2 07/18/2013
- 3) Introducing the Introduction 07/23/2013
- 4) Materials and Methods 07/29/2013
- 5) Top 10 Submission Tips 08/02/2013
- 6) Discussing the Discussion 08/06/2013
- 7) Figure It Out 08/20/2013

See also Blow, N.S. (2013). The write way. *BioTechniques*, 54, 235.

# Important Steps to Address in Writing a Scientific Article

- Select a journal based on desired audience
- Decide on the scope of information
  - How much data will be covered? Should the material be subdivided into more than one article?
- Decide on article category
  - Research article, technical report, case report, etc.
- Pay attention to the reference format

**As an editor, one of the first things I examine is the reference list...**

If the authors are not consistent with their reference format or sloppy with details (e.g., missing volume or page numbers), then I may have concern with the quality of the work because **DETAILS MATTER IN SCIENCE!**

# The “**IMRAD**” Structure for Scientific Papers

- **I**ntroduction – what question is being studied?
- **M**ethods (& Materials) – how study was performed?
- **R**esults – what were the findings in the study?
- **A**nd
- **D**iscussion – what do these findings mean?

“The scientific paper is the sum of its component parts.” (Robert A. Day)

**The title, authors, abstract, and keywords are critical to indexing and subsequent searches by potential readers**

# Some Decisions to Be Made

- How to subdivide information into digestible sections?
- What information is needed in Materials and Methods to permit someone to follow and repeat your experiments?
- What should be covered in a figure or table?
- What should be supplemental material versus material in the paper itself?

# Thoughts on How to Write a Scientific Paper

- **Outline the ideas first** with a purpose and plan
  - Decide on scope & audience and select target journal
- Write Materials and Methods section first
- Prepare all figures & tables
  - captions should be stand-alone
- Write Results and Discussion based on data shown in figures & tables
- Write Introduction to provide context to your work
- Prepare reference list according to journal format
- **Write abstract last and then finalize title**

Read the “Author Guidelines”, which are available from most journals!

*Journal of Forensic Sciences*: <https://onlinelibrary.wiley.com/page/journal/15564029/homepage/forauthors.html>

*Forensic Sci. Int. Genet.*: <https://www.elsevier.com/journals/forensic-science-international-genetics/1872-4973/guide-for-authors>

## Guide for Authors



Download Guide for Authors in PDF



- Your Paper Your Way

### INTRODUCTION

- Types of paper
- Contact details for submission
- Submission checklist

### BEFORE YOU BEGIN

- Ethics in publishing
- Studies in humans and animals
- Declaration of interest
- Submission declaration and verification
- Use of inclusive language
- Author contributions

- Changes to authorship

- Copyright
- Role of the funding source
- Open access
- Submission

### PREPARATION

- NEW SUBMISSIONS
- REVISED SUBMISSIONS
- Article structure
- Essential title page information
- Highlights
- Artwork

- Tables

- References

- Video

- Data visualization

- Supplementary material

- Research data

### AFTER ACCEPTANCE

- Online proof correction

- Offprints

- Author orders

### AUTHOR INQUIRIES

# *FSI Genetics* Guide to Authors

# My Experience with Writing

- **Focus**

- **Environment** – I need **a quiet place** with no interruptions in order to get into the flow of writing
- **Time** – I need **long blocks of time** (around 6 hours has been optimal for me, which typically means late at night)

- **Perspective**

- **Think from the readers' perspective** (this will require learning to step outside of yourself and see what you have written with fresh eyes)
- Work on **content flow and clarity** (this will require multiple re-writes to your manuscript)
- **Know your audience** (you should select a journal from which you have read articles previously)

# References to be Cited are Gathered

- When I begin writing a new article, I like to **gather printed copies of relevant articles** from my files (or newly printed copies from electronic files) on the topic
- This pile of papers is then reviewed in preparing the introduction as well as the reference list

# Thoughts on Creating Appropriate Titles

- Consider that **your title will be read more than anything else in your paper** – perhaps by thousands of people
  - The entire paper may not be read by anyone (except hopefully at least your coauthors!)
- Robert Day defines a good title as containing **“the fewest possible words that adequately describe the contents of the paper”**
  - “The meaning and order of the words in the title are of importance to the potential reader who sees the title in the journal table of contents.”
  - **“In designing the title, the author should ask: ‘How would I look for this kind of information in an index?’”**
  - “Avoid abbreviations in the title”

# Some Example Titles

*consider which ones look most interesting for you to read*

1. Revised guidelines for the publication of genetic population data
2. An artificial neural network system to identify alleles in reference electropherograms
3. Sequence-based diversity of 23 autosomal STR loci in Koreans investigated using an in-house massively parallel sequencing panel
4. Mitogenomic diversity in Russians and Poles
5. mtDNA sequence diversity of Hazara ethnic group from Pakistan
6. Evaluation of the InnoTyper<sup>®</sup> 21 genotyping kit in multi-ethnic populations
7. A selection guide for the new generation 6-dye DNA profiling systems
8. Characterisation of artefacts and drop-in events using STR-validator and single-cell analysis
9. A phylogenetic approach for haplotype analysis of sequence data from complex mitochondrial mixtures
10. Application of DIP-STRs to sexual/physical assault investigations: Eight case reports

# Authorship

- **Authorship brings both credit and responsibility**
  - Can **each author** explain and defend the data and conclusions made in the article?
- Co-authors should read and agree with the final version of the article PRIOR to submission!
- The acknowledgments section exists to express appreciation for those who have contributed but not enough for authorship
  - not necessarily appropriate to include everyone in your lab
  - simple sample contribution should not guarantee authorship

For a discussion on authorship vs. contributorship, see <http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html>

- **Many journals now require the role of each listed author to be described**

# A Coauthor or Simply Listed in the Acknowledgments? → It May Be Your Decision

European Journal of Human Genetics (2007) 15, 288–293  
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www.nature.com/ejhg

ARTICLE

## Africans in Yorkshire? The deepest-rooting clade of the Y phylogeny within an English genealogy

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### Acknowledgements

*We thank all DNA donors, John Butler for access to samples, and anonymous reviewers for helpful comments. TEK was supported by a Wellcome Prize Studentship (061129), MAJ by a Wellcome Trust Senior Fellowship in Basic Biomedical Science (057559), and YX and CTS by the Wellcome Trust. EJP was supported by the Arts and Humanities Research Board and the EC Sixth Framework Program under Contract No. ERAS-CT-2003-980409, as part of the European Science Foundation EUROCORES Program OMLL.*

My laboratory at NIST assisted by supplying a single DNA sample and data, which to me did not rise to the level of coauthorship...

# The Order of Authors

- First author (or joint first authors)
  - Primary drafter of the manuscript
- Anchor author
  - Last author listed, usually the principal investigator
- Corresponding author
  - Handles submission and correspondence with the editor
  - Often the first author (who drafts the manuscript) or anchor author (who typically oversees the project)
- **Authorship should ideally be decided by those contributing to the research before the project is completed and the manuscript is written**
- Recommend consistently using full names (e.g., “John M. Butler” rather than “J.M. Butler”) as this helps indexing and searching

# Writing the Abstract

- Sketch out text at the beginning stages but **finish the abstract last after the article is written**
- **This should be your best work** as it will be the most read portion of your paper (next to the title)
- Provide sufficient detail to encourage the reader to decide to read the entire paper but ensure that you are accurate in summarizing your work so as to not falsely advertise information that is not in the paper

# Selecting Appropriate Keywords

- Selecting appropriate keywords aids indexing services so that other researchers can find your paper when they perform searches
  - Robert Day commented: **“The words in [a scientific] paper should be weighed as carefully as the reagents in the laboratory.”**
- Your keywords and subject classification during submission can help editors find appropriate peer reviewers

# Preparing the Introduction to a Paper

- The purpose of the introduction is **to describe the problem you are studying and some of its history** – **not to just cite previous papers from your group** (to try and improve someone's *h*-index)
- **You need to understand the history of the problem, but you do not need to share everything you know!**

**“All problems have histories and the wisest route to a successful solution to nearly any problem begins with understanding its history.”**

- David McCullough (2017) *The American Spirit*, Simon & Schuster: New York, p. 20

Often the first portion of an article that is written

## Writing the Materials and Methods Section

- Describe experimental details with enough information so that someone else could replicate your measurements and interpretation if desired
  - List the city and country the first time a manufacturer's product is named
  - List software programs used and statistical tests employed for calculations
  - List any variations from manufacturer's protocol
  - Cite institutional review board approval (if applicable)
- Significant figures with numerical results reported
  - Relates to population allele frequencies and DNA quantitation values
  - For example, using "15.125 pg" is not appropriate as this number of significant figures implies a level of certainty that does not exist

# Results and Discussion

- Decide on how to tell the story of your project
- Prepare figures and tables first
- **Describe findings step-by-step in walking the reader through your data**
- Interpret your results in the discussion section in the context of other work, which may have been mentioned in the introduction
  - Sometimes a separate “Conclusions” section can be included at the end of your article

# Reference List

- Should be appropriate, relevant, and without any mistakes
  - In my opinion, your scientific abilities and reputation are connected to quality citations to appropriate references
- As an editor, I use the reference list as a gauge for the attention to detail that authors exhibit
  - If references are incomplete, have mistakes, or are in different formats, then I can lose confidence in quality of the work coming from the authors
- **Extensive self-citation suggests both a lack of humility and perhaps failure to appreciate the work of others in the field**
  - **Are you really familiar with the literature if you can only cite your own work?**

# Acknowledgments

- Credit funding sources (\$)
- Express appropriate appreciation for input of other individuals who are not coauthors but who assisted in some way
  - you can be specific with describing their contributions
- If the anonymous reviewers (and possibly editor) provided useful feedback in their initial reviews, then they may be recognized in the revised manuscript

# Suggestions for Writing and Re-Writing

- Write, then read, then re-write, then read, then re-write (continue this process as needed)
  - **Dozens of drafts may be required to polishing a text into the desired document**
- **Read the text out loud as you are editing...**
  - Write as if you were presenting to a friend
- Write in short sentences where possible
  - Omit unnecessary words
  - Don't use words your audience will likely not understand. Your goal is to clearly explain your work, not sound smart.

# The Science of Scientific Writing

George Gopen & Judith Swan (1990)

## Some Recommendations to Improve Accessibility:

- 1) Put grammatical subjects close to their verbs
- 2) Put information intended to be emphasized towards the end of a sentence (the **stress position**)
- 3) Place the person or thing whose “story” a sentence is telling at the beginning of the sentence (the **topic position**)
- 4) Provide context for the reader before sharing anything new

To provide good flow, place old information in topic positions, and place new, emphasis-worthy information in stress positions.

# An Example of These Gopen & Swan (1990) Recommendations

*Authority established*

1

*subject*

*verb*

“The Forensic Science Service recently noted that

sporadic contamination of consumables used in DNA

3 *topic position*

testing, such as the small tubes in which the PCR

4 *context provided*

amplification is performed, can introduce extraneous

*stress position*

DNA profiles (Howitt *et al.* 2003).”

2

*Source provided*

# English Language Assistance

- If English is not your primary language, it may be helpful to obtain language editing help
- **Reviewers and editors may reject your article outright if it contains poor English**
  - This is a common challenge for many articles submitted from Asia
- On-line resources exist to improve your English writing skills (e.g., <https://cgi.duke.edu/web/sciwriting/>)
- Fees to perform English editing can be hundreds of dollars per manuscript

# Use of Numbers

- Do not start a sentence with a number
  - e.g., “32 people were studied...” should instead be “Thirty-two people were studied...”
- Spell out single-digit numbers
  - One, two, three, four, five, six, seven, eight, nine, 10, 11, 12, 13, 14, 15, ...
- In a sentence containing more than one number, all can be listed numerically
  - e.g., “...we observed 5 blue, 6 green, and 14 yellow items...”

# Additional Thoughts

- Writing involves a lot of re-writing (edit, edit, edit)
- Re-read your manuscript one final time before submission (perhaps after waiting a day or two to approach it with a fresh perspective)
- **Ask others for their input** (and be willing to listen and learn from their suggestions)
  - At NIST, we have an internal review process for all manuscripts before they are submitted to a journal

# Errata and Letters to the Editor

- **Mistakes happen and should be corrected to fix the scientific record**
- If you discover the mistake
  - a Letter to the Editor can be written and submitted to note the correction needed (called an “erratum”; “errata” is plural form)
- If someone else discovers your mistake or raises a concern (regarding an issue that is real or perceived), then the critic(s) may write a Letter to the Editor exposing the issue
  - Original authors being criticized are typically given an opportunity to respond
  - Be kind in responding to critics and treat them with respect even if you disagree with their position

# Creating Figures and Tables

# How Data Are Presented Makes a Difference

**(A)**  $t$  (time) = 15',  $T$  (temperature) = 32°;  $t$  = 0',  $T$  = 25°;  
 $t$  = 6',  $T$  = 29°;  $t$  = 3',  $T$  = 27°;  $t$  = 12',  $T$  = 32°;  $t$  = 9',  $T$  = 31°

**(B)**

Time (min)	Temperature (°C)
0	25
3	27
6	29
9	31
12	32
15	32

**(C)**

Temperature (°C)	Time (min)
25	0
27	3
29	6
31	9
32	12
32	15

# Why Readers Prefer a Specific Order

Contextual  
information  
appearing in  
regular steps

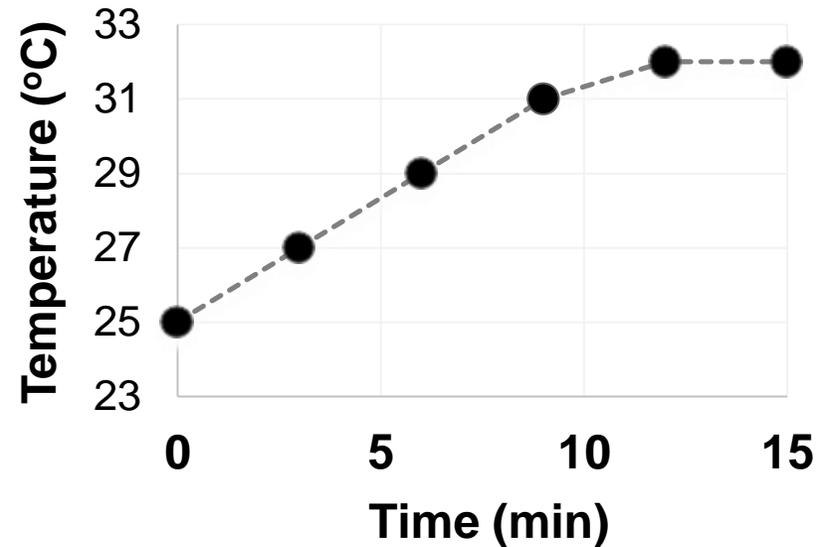
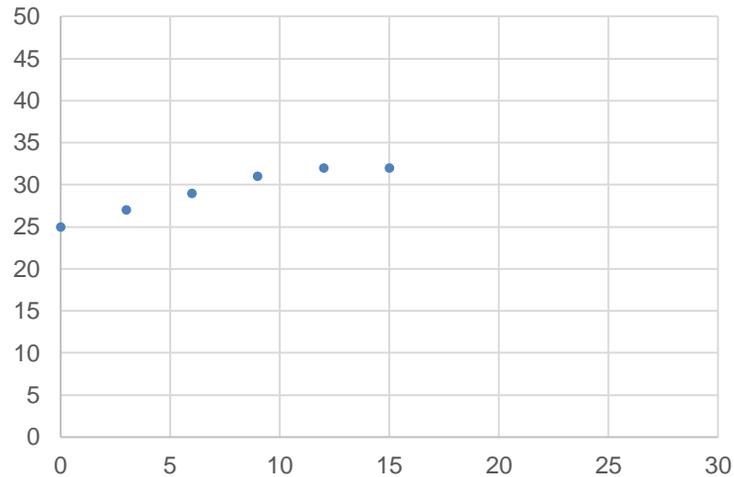
The “new”  
(measured)  
information

Time (min)	Temperature (°C)
0	25
3	27
6	29
9	31
12	32
15	32

- In English, we read left to right
- Thus, we prefer **contextual information on the left** (in this example, time)
- And our brains prefer **the new information**, what we are trying to “discover” from the measurements made, **on the right** (in this example, temperature)

# The Same Data – but in a Figure Format

$t$  (time) = 15',  $T$  (temperature) = 32°;  $t = 0'$ ,  $T = 25°$ ;  
 $t = 6'$ ,  $T = 29°$ ;  $t = 3'$ ,  $T = 27°$ ;  $t = 12'$ ,  $T = 32°$ ;  $t = 9'$ ,  $T = 31°$



- No axis labels or units (min, °C)**
- Small axis values**
- Not scaled to emphasize data**
- Data points are small**
- Grid lines can be distracting**



# Table and Figure Captions

- Captions should be **descriptive enough** so that the table or figure **can be understandable independent of the text**
- I try to think through each element of the table or figure as if I was a reader encountering the information for the first time
  - Remember that writing involves telling a story about your findings so think carefully about how data are conveyed and described

# Submission & Peer-Review Process



# 2015 Numbers from Elsevier

- **Authors:** **1.8 million unique authors worldwide submitted 1.3 million manuscripts** to Elsevier journals. (For context, we estimate the total number of active researchers globally at some 7.8 million in 2015.<sup>1</sup>)
- **Reviews:** **700,000 peer reviewers conducted 1.8 million article reviews**, under the guidance of approximately 17,000 "high level handling editors." An additional 63,000 editors are affiliated with our journals, totaling 80,000 Elsevier editors. Approximately 7,000 of those editors were appointed in 2015.
- **Articles:** Approximately **400,000 of those manuscripts were eventually published** in approximately **2,500 active Journals** — 73 of which were launched in 2015. 400,000 is about 16%<sup>2</sup> of the total number of scholarly articles published worldwide in 2015.
- **Archive:** The 400,000 new articles brought the total number of documents available on ScienceDirect to more than 13 million. (It is over 14 million today.)
- **Access:** These articles were accessed by around 12 million people per month, with close to 900 million full-text article downloads for the year.
- **Citations:** Elsevier articles published in the 5 years ending 2014 were cited 11.5 million times in the same period.<sup>3</sup> *meaning Elsevier punches above its weight with more than 25% citation share.*

# Importance of Selecting an Appropriate Journal

- Depends on your intended audience
- Speed to publication
- Impact factor of the journal
- Remember that **peer-review is not perfect**
  - If a poor quality article (or one you have a specific concern with) makes it through the process, then a letter to the editor may be an appropriate avenue to pursue further clarification or correction
- **An editor can reject an article if it is not considered appropriate for the journal's intended audience**

## Forensic Science International: Genetics

Welcome to the online submission and editorial system for *Forensic Science International: Genetics*.

*FSI: Genetics* will be specifically devoted to Forensic Genetics. This branch of Forensic Science can be defined as the application of Genetics (in the sense of a science with the purpose of studying inherited characteristics for the analysis of inter- and intraspecific variations in populations) for the resolution of legal conflicts. This includes paternity testing, criminal casework, and identification of human remains. Although protein and enzyme polymorphisms were firstly used to fulfil the aims of the field they have been substituted nowadays by DNA polymorphisms analyzed by a variety of molecular biological typing technologies. The amount of work in this field has increased enormously with no signs of slowing down with many new applications such as the application to non-human DNA material (crime scene, illegal trade in endangered species evidences, and bioterrorism) and the building and appropriate management of DNA databases.

The scope of the journal includes:

- Forensic applications of human polymorphism: testing of paternity and other family relationships, immigration cases, typing of biological stains and tissues from

### Author Information

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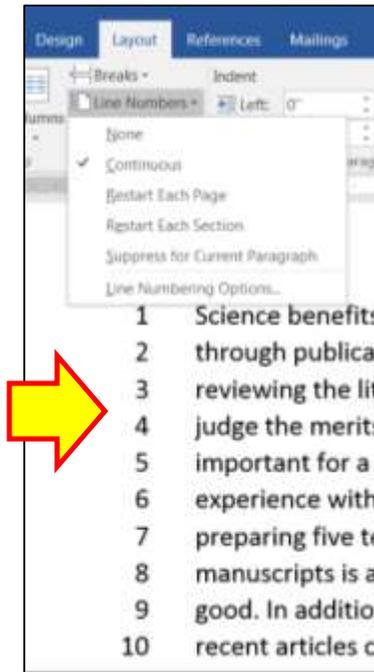
[Reviewers' Home](#)

[Reviewers' Update](#)

# Manuscript Submission

- Cover letter
  - Although not always required, it helps to **introduce your article with a brief letter to the editor** briefly reviewing your work and its importance
- Suggested reviewers
  - You are welcome to **identify potential reviewers** and reviewers who may have a conflict of interest (suggest who should not review your work)
- **Do NOT co-submit** your article to another journal!
  - We have caught several authors who have done this in the past few years and have banned them from submission to both journals for a period of time

# Other Items with Submissions



- Review the Journal's Guide for Authors
  - <https://www.elsevier.com/journals/forensic-science-international-genetics/1872-4973/guide-for-authors>
- **Include line numbers** next to the text for submitted manuscripts so that these numbers can be used for peer-review purposes
- Please **work on the English grammar** and spelling **BEFORE** submitting the manuscript (peer-reviewers should not be your language police)

## A Recent Example...

- **Editor:** *“Please work with a native English speaker if possible to help polish the language as noted by Reviewer #1 below. Once the grammar is improved further, the article appears ready for publication.”*
- **Response:** **“We have revised the language as noted by Reviewer #1 and polished the grammar as possible as we can.”**

# BioTechniques' Top 10 Submission Tips

from Nathan S. Blow, PhD, editor-in-chief, August 2014

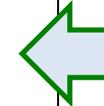
1. Know the journal
2. Know the submission and formatting guidelines
3. Write with an active voice
4. Avoid “wordiness”
5. Practice quality control
6. Create a true cover letter
7. Know your references
8. Format figures and captions correctly
9. Ask the editor
10. Rebut decisions effectively (and respectfully)

# Editor Options with *FSI Genetics* Articles

No Decision
Reject pre review and suggest transfer
Reject post review and suggest transfer
Reject due to Poor Language
Minor Revision & Submit Interactive Plots
Accept
Revise not Ready for Peer Review
Provisionally Accept
Revise
Reject

*the manuscript can be transferred to **another Elsevier journal** for consideration*

- *Forensic Science International*
- *Science & Justice*
- *Legal Medicine*



	Original Submission	Revision 1
Review #1	<a href="#">Minor Revision</a>	<a href="#">Minor Revision</a>
Review #2	<a href="#">Major Revision</a>	<a href="#">Accept</a>
Editor	<a href="#">Revise</a>	<a href="#">Revise</a>

# Some Reasons Why Articles Are Rejected

- Material covered in the article is deemed **inappropriate for the journal or insufficiently novel** by the reviewers and/or the editor
- **Poor English language and grammar** make it challenging for the article to be understood
- One or more of the reviewers feel that **conclusions cannot be supported** by the results
- **Poor experimental design** such that results obtained are not meaningful
- **Rude responses** to reviewers and/or editors **that fail to address concerns** raised during revision

# Responding to Reviews with Revisions

- Address reviewer and editor concerns point-by-point in a direct and pleasant manner
  - Your purpose is to convince the editor (and often the original reviewers) that you have carefully considered the initial concerns raised
- Provide respectful rebuttals
  - Criticism is hard to take but is necessary to improve your work

# Potential Reasons for Delays

- Handling editor may be busy or on travel and slow in assigning potential reviewers
- Potential reviewers decide not to accept and editor has to find other reviewers
- Reviewers are busy and delay turning in their reviews (and editor may have to wait for a second or third review before making a decision)
- Once all reviews are into the editorial system, handling editor is notified but may be busy or on travel and slow in making a decision

# Example Timeline for Process of Review

extracted from *FSI Genetics*  
correspondence history

Step	Date	# Days	Activity
1	11 May	0	<b>Authors submit their manuscript</b>
2	12 May	1	Submission verified by journal
3	3 June	23	Handling Editor assigned
4	6 July	56	Reviewed invited
5	8 July	58	Reviewer #1 accepts invitation
6	6 Aug	87	Reviewer #1 completes review and requests minor revisions
7	7 Aug	88	Reviewer #2 accepts invitation
8	11 Sept	123	Reviewer #2 completes review and requests major revisions
9	28 Sept	140	Handling Editor completes review and provides feedback to authors to revise their submission
10	3 Nov	176   0	<b>Authors submit revision</b>
11	5 Nov	178   2	Handling Editor assigned
12	5 Nov	178   2	Same reviewers invited to examine revision
13	12 Nov	185   9	Reviewer #2 accepts invitation
14	14 Nov	187   11	Reviewer #2 completes review and accepts revision
15	20 Nov	193   17	Reviewer #1 accepts invitation
16	29 Nov	202   26	Reviewer #1 completes review and accepts revision
17	29 Nov	202   26	Handling Editor accepts the revision and notifies the authors
18	22 Dec	225	Publisher notification of accepted manuscript

Editor-in-Chief busy (*delayed handling editor assignment*)

Editor traveling (*delayed reviewer assignment*)

Reviewer on summer holiday?

Editor traveling (*delayed author feedback*)

# Some Problems I Have Seen as an Editor

- All authors did not review article before submission of revision (and the corresponding author had moved to another laboratory)
- Methods were missing critical details so that experiments could not be repeated
- Misspellings and grammar mistakes
- Potential conflicts of interest not identified

# Galley Proof Review

- Galley proofs are provided to authors to verify the type composition when a manuscript is laid out for publication
- **Review them carefully** – **all authors should see them** – this is your last chance to avoid appearing foolish before your article goes into print...
- **This can be a lot of work** for the first author and/or corresponding author

# Reprints

- Ordering reprints to give to colleagues is not as common today as it was in the past
- Check with publisher for rules with providing pdf files via email or via website
- **Open Access** enables authors to purchase articles and cover the costs associated with publication (layout, printing, creating e-file, etc.)

# The Elsevier Publishing Campus

<https://www.publishingcampus.elsevier.com/>



Free lectures, training and advice in:

- **writing** a journal article or book,
- learning **how to conduct peer review**,
- **understanding** research and publishing **ethics**
- **preparing a successful grant application**

# My Overall Summary Thoughts

## READ

- The best preparation to write well is to **critically read a lot of papers**

## WRITE

- **Writing well takes practice** and is one of the most valuable skills you can develop
  - Effective communication benefits scientific advancement

## REVIEW

- **Help review** the work of other scientists
  - As an editor, I appreciate your willingness to be a reviewer when you are asked to help
  - An important way to give back to the community

# A 2017 U.S. National Academies of Sciences Report

## Communicating SCIENCE Effectively

### A Research Agenda

Committee on the Science of Science Communication:  
A Research Agenda

Division of Behavioral and Social Sciences and Education

A Report of

*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

- “Communicating science effectively ... is a complex task and **an acquired skill.**” (p. 1)
- “Many believe the scientific community has **a duty to engage with society to disseminate this knowledge** and provide a return on society’s investment in the science enterprise.” (p. 11)
- “Any **communication involves a communicator, an audience, and channels of communication** that are often bidirectional...” (p. 11)
- “The scientific community has **an obligation to communicate** the results of its work to the rest of society.” (p. 16)

# Thank you for your attention

**Points of view are the presenter** and do not necessarily represent the official position or policies of the National Institute of Standards and Technology.

Certain commercial equipment, instruments and materials are identified in order to specify experimental procedures as completely as possible. In no case does such identification imply a recommendation or endorsement by the National Institute of Standards and Technology nor does it imply that any of the materials, instruments or equipment identified are necessarily the best available for the purpose.

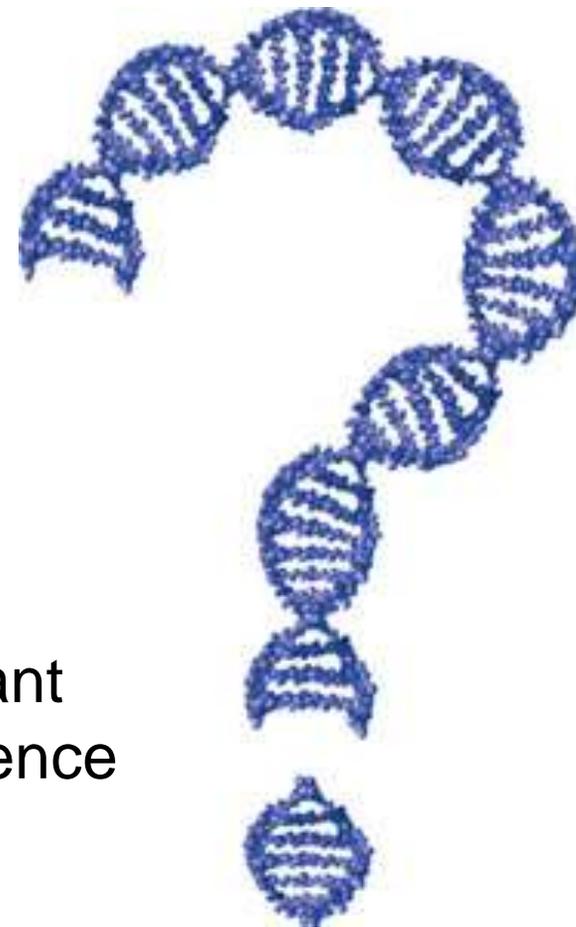
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**A copy of this presentation will be available at:**  
<http://strbase.nist.gov/training.htm>